THE IRON TRADE REVIEW

VOLUME XXIX. CLEVELAND, O. NOVEMBER 19, 1896. CHICAGO, ILL. NUMBER 47.

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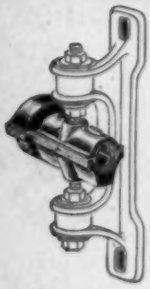

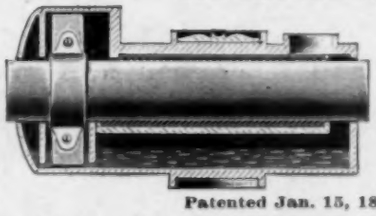

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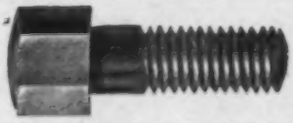

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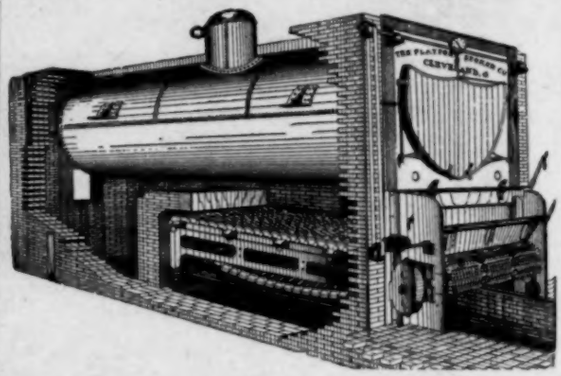

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THE IRON TRADE REVIEW

VOLUME XXIX. CLEVELAND, O. NOVEMBER 19, 1896. CHICAGO, ILL. NUMBER 47.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The noteworthy fact of the past week is the advance in nearly all forms of finished material not controlled by agreements. On a considerable volume of business $1 a ton above late October prices has been obtained, and in some instances sellers have put their figures $2 a ton above that basis. The decision reached at the billet meeting in New York, referred to in detail elsewhere, has given a firmer tone to all steel products, with indications that the advances now asked will be maintained. Angles, bars and plates are notably stronger. Structural material and plates have seen the most active demand in the week, particularly at Chicago and Pittsburgh. In some other forms of material less has been closed, buyers evidently waiting to know the outcome at New York. But from every quarter comes the report of steadily increasing inquiry—an indication that a considerable tonnage, not in large orders, but in the aggregate of well scattered buying, is soon to come to the mills. In connection with the steel manufacturers' meeting at New York there was a conference of beam interests, resulting in the continuance of the present basis. The steel rail agreement was also made effective for another year, without change in price. The feeling is general as expressed in recent meetings, beginning with that of bar iron manufacturers last week, that a gradually ascending grade is ahead. Pig iron sales have fallen off somewhat from the rate of several weeks preceding, and though small-lot buying is steady, it appears that many buyers are covered for the next few months. Prices are generally maintained, though Bessemer, so far as actual transactions go, is scarcely as strong as in the week of election, speculative buying being checked for the time. The Pittsburgh market is $12.40 to $12.50, equivalent to $11.75 to $11.85 in the valley. Southern furnaces are holding prices well and the present Birmingham quotations are $7.75 for No. 2 foundry, $8 for No. 1 soft, $7.50 for No 2 soft and $7 for gray forge. In the North, pig iron production is increasing and it would be conservative to put the weekly capacity of furnaces started since election or planning to start this month at 20,000 tons—an increase of 1,000,000 tons in the yearly rate. This week's sessions of the sheet and tin plate manufacturers at Pittsburgh have brought out encouraging reports of the prospects in those lines. In tin plates the chances are good for a rehabilitation of the "gentlemen's agreement," and a maintenance of prices on domestic plates more closely approximating those on imported plates. The wire nail meeting soon to be held may be the one exception to the result of recent conferences. Either disruption or a considerable reduction in prices is predicted. The sources of supply, uncontrolled by the pool, are getting more numerous every week, and the task of stopping up these lakes, many of them large ones, has grown to a practical impossibility.

THE CLEVELAND DISTRICT.

The last vessels are being loaded at Two Harbors, Duluth and Ashland, this week, and barring a few cases in which frozen ore may carry the work over to next week, the record of shipments at these ports is practically made up. The difficulty of getting the ore is now almost insurmountable and the wind-up will come a week or 10 days earlier than was the case last year. Some mines that have been closed for the past two months are starting small forces and preparations are making on all the old ranges for a winter of fair activity. Some further sales of non-Bessemer ores are reported and a number of cargoes of Spanish-American ores have been placed recently with Eastern furnaces.

Pig Iron. Bessemer pig iron has been less active the past week than in the early weeks of the month, and a subsidence of the speculative demand at Pittsburgh has lowered the quotation there a trifle, the basis now being $12.40 to $12.50. However valley furnaces are very firm in their attitude. While a limited amount of metal might be sold at $12, furnace, other producers hold for $12.25 to $12.50, deliveries extending over the first two months of 1897, and in still other cases the minimum that would be entertained is $13. Foundry iron has had a steady small-lot sale. On No. 1 foundry $11.50 at furnace has been obtained, but there are sales at $11.25 for No. 1 strong or for Scotch iron. In some directions foundry work seems to be looking up and furnaces are able to make steadier shipments than in October. There are now six active furnaces in the Youngstown district and within a few days the Shenango valley will have a like number in blast. It does not appear, however, that the resuming furnaces have any large amount of business booked ahead. Gray forge has been active and is quoted from $10 to $10.50, valley. Cleveland prices follow:

Bessemer	$12 40@12 65	Valley Scotch No. 1	$12 00@12 25
No. 1 Strong Foundry	12 00@12 25	Valley Scotch No. 2	11 50@11 75
No. 2 Strong Foundry	11 50@11 75	Gray Forge	10 50@10 75
No. 3 Foundry	11 00@11 25	Lake Superior Charcoal	13 50

Finished Material. A large amount of inquiry is reported on nearly all classes of finished material. Mails have shown an increase over last week and prospects are regarded good for a fair business well into December. The advance in bar iron came at a time when a considerable amount of business was being figured on which doubtless would have been placed at once at the old price, but may now wait a little. Steel bars are from $1 to $2 a ton above the lowest prices and some Pittsburgh producers are quoting 1.10c to 1.20c, Pittsburgh. The Cleveland market is fairly up to the 1.15c basis established for bar iron. Angles and plates are up $1 a ton, the quotation for the former being 1.23c to 1.28c, Cleveland. Tank steel is 1.20c to 1.25c, Cleveland, some difference existing in the ideas of various mills. A vessel contract for plates about to be placed last week has been postponed, and there are rumors of a considerably larger tonnage when the matter is taken up again. Sheets are firmer and on No. 27 black 2.20c, Cleveland, is quoted. Structural material is in only moderate demand. Prices remain on the 1.63c basis, Cleveland, for beams and channels. The mills have taken some interest in old material the past week. A railroad sale of 7,000 tons brought out lively bidding. For old iron rails as high as $17 is said to have been paid, $13 for No. 1 railroad wrought scrap and $16.50 for old iron axles. Quotations on wrought turnings are $7.75 to $8; cast borings $6.75 to $7.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Nov. 18.

Excepting in two or three lines, last week was a very quiet one in iron circles in this district. The largest business of the week was in structural material and plates, for which several large orders were taken, including one of 4,000 tons of bridge material, and one of 4,500 tons and one of 2,000 tons of plates. The plates were for ship building concerns at Chicago and Bay City. The market for pig iron is quiet and orders have fallen off to some extent in the past week. Quotations are maintained at the advances made recently. Prices of finished material are firmer than they were a week ago and in some cases have been advanced. It is understood that at the meetings of the billet and beam associations in New York last week prices were reaffirmed.

PIG IRON.—The market was quiet last week, no very large orders having been taken by either Northern or Southern furnaces. The demand appears to have fallen off to some extent and the inquiries in hand do not foot up to as large a total as was the case last week. Consumers are hardly taking their iron as fast as the furnaces would like but in this respect matters are improving all the time. A large number of the foundries in this territory which have been shut down entirely or only taking off two or three heats a week have increased their forces of men and are casting more frequently than for some time past. The agricultural implement manufacturers, who have been running very light for the past three months, are doing considerably better now and will probably use quite a good deal more iron in the near future. Prices of both Northern and Southern irons are being maintained at the recent advances and in some cases higher prices than those we give are asked for deliveries extending several months into next year. Quotations are as follows:

Lake Sup. Charcoal	$13 50@14 00	Southern No. 2 Soft	$11 15@11 40
Local Coke Fdy. No. 1	11 75@12 25	South'n Silveries No. 1	11 15@11 65
Local Coke Fdy. No. 2	11 25@11 75	South'n Silveries No. 2	10 90@11 15
Local Coke Fdy. No. 3	11 00@11 25	Jackson Co. Silveries	14 00@16 05
Local Scotch Fdy. No. 1	11 75@12 25	Ohio Silveries No. 1	15 00@15 55
Local Scotch Fdy. No. 2	11 25@11 75	Ohio Silveries No. 2	14 50@15 05
Local Scotch Fdy. No. 3	11 00@11 25	Ohio Strong Softeners	14 00@14 28
South'n Coke No. 1	11 90@12 40	Alabama Car Wheel	16 25@16 75
South'n Coke No. 2	11 40@11 90	Malleable Bessemer	12 75@13 50
South'n Coke No. 3	10 90@11 40	Coke Bessemer	13 00@13 50
Southern No. 1 Soft	11 40@11 90		

BAR IRON.—As the result of the Merchant Bar Iron Association's meeting at Cleveland last week, at which the advance of $2 a ton was made on bar iron, it was agreed by concerns rolling both kinds of material that soft steel bars should be kept as near to the basis for iron as possible. Sales last week were lighter than in the week before, but included some fairly good orders. Quotations are made as follows: Common iron, 1.15c to 1.20c; guaranteed, 1.20c to 1.30c; soft steel bars from strictly billet stock, 1.20c to 1.25c.

RAILS AND TRACK SUPPLIES.—Business is limited to orders for light sections for immediate shipment. Prices are made: Rails, $29; splice bar, 1.30c to 1.35c; track bolts, with square nuts, 1.90c to 2c; hexagon nuts, 2c to 2.10c; spikes, 1.65c to 1.75c.

BILLETS AND RODS.—A few small orders for billets were taken last week at the Association price of $21.25. Nothing was done in rods and quotations have been withdrawn for the present.

STRUCTURAL MATERIAL.—Business in this line continues to be very large and several good contracts were closed last week. An order for 4,000 tons of bridge material was taken from a Chicago bridge building works by a Pittsburg mill and the same mill took an order for 2,000 tons of car material from a near-by car works. General business is very good and a number of round lots were sold last week. Quotations are firmer and are revised as follows: Beams and channels, 1.70c to 1.75c; angles, 1.30c to 1.35c; plates, 1.30c to 1.35c; tees, 1.50c to 1.55c. Small lots from stock are quoted ¼c to ½c higher.

PLATES.—A large tonnage of plates was closed by the local mill last week, including an order for 4,500 tons of ship plates for two steamers and barge, contracts for which were taken last week by the Chicago Shipbuilding Co. An order was also closed for 2,000 tons of ship plates for vessels to be constructed at Bay City. General business was very good and a number of fair orders were closed last week. Quotations are firmer and are revised as follows: Tank steel, 1.30c to 1.35c; flange steel, 1.50c to 1.60c; fire-box, 2.15c to 5c.

SHEETS.—Quite a number of orders were placed last week by consumers and jobbers whose stocks had become low in the dull period preceding election. This class of buying constituted the bulk of the week's business. Quotations are made at 2.25c for No. 27 black and 80 and 2½ per cent discount for galvanized.

MERCHANT STEEL.—Orders were not particularly large last week although a few fairly good ones were closed. The demand is hardly as large as it was a week ago. Prices are as follows: Open hearth spring, tire and machinery steel, 1.85c to 1.95c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.55c to 1.65c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

OLD RAILS AND WHEELS.—There has been considerable figuring on old material among dealers but very few transactions have resulted. Quotations are only nominal. Old iron rails are held at $14.50 to $15; old steel rails at $8.50 to $10.50, according to length, etc., and old wheels at $13 to $13.50

SCRAP.—Consumers as a rule are not in the mood for making heavy purchases. Most of the business closed last week was among dealers, though two or three important consumers bought moderately. Holders for the most part are asking considerably more than buyers are willing to pay. Quotations are nominal. The following are quotations furnished by dealers: Railroad forge, $12.50 to $13; dealers' forge, $11 to $11.50; No. 1 mill, $8.50; heavy cast, $9.50 to $10; malleable, cast, $9.50 to $10; axles, $16; cast borings, $4; wrought turnings, $5.50; axle turnings, $7.25; mixed steel, $7.50; stove plates, $5.75; heavy melting steel, $9 to $9.50.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Nov. 18.

Finished lines are at last feeling the results of restored confidence and almost every line shows marked improvement over the week preceding. Prices, too, are firmer, angles, plates and sheets being held at higher figures. Bessemer, on the contrary, is somewhat easier and the week has brought few if any sales of consequence. The firm tone of the market is unaltered, however, and activity is anticipated before long. Gray forge continues very active and several sales are reported. Slight activity in scrap—the first in many weeks—is noted, but with no material change in prices.

PIG IRON.—The week has been uneventful but has been characterized by a steadiness which was quite welcome, after the fluctuating market of the ten days preceding. Prices are well sustained and a further advance is asked by some furnaces. Little demand is felt as yet and the advance in iron is based almost entirely on confidence in the future. A few sales of Bessemer are reported ranging in price from $12.40 to $12.50, Pittsburgh. Several furnaces refuse to shade $12 at the furnace and are holding their iron. Gray forge has absorbed the attention of furnacemen and has been sold in considerable quantities. We note sales of 1,000 tons at $10.30, December delivery; 500 tons at $10.35 and 1,000 tons at $10.35, both December delivery. Lots of

50 and 100 tons of foundry iron have been sold at slightly better prices, but the change for the better is not so apparent as in other lines. We note sale of 1,000 tons of No. 2 at $11.25. Quotations follow:

Bessemer	$12.40 to $12.50
No. 1 Foundry	12.00 to 12.25
No. 2 Foundry	11.25 to 11.50
No. 3 Foundry	10.75 to 11.00
Gray Forge	10.30 to 10.65

BILLETS AND RODS.—Interest in the workings of the pool is at a high pitch and a tendency is apparent to await developments. The New York meeting left the price unchanged, but adopted a new basis which takes account of finished material and that puts a limit on the amount a steel company may turn out without paying the pool tax. This is regarded as likely to hold the prices of finished material above a demoralized basis and to give the buyer of billets more of a chance for his life. Steel is offered below pool rates but there is absolutely no demand for raw steel save for sheet and tin plate bars, both of which lines are fairly active. Rods are beginning to show some activity but no sales are reported.

STRUCTURAL MATERIAL. — The Buffalo court house, involving 1,600 tons of material, has been taken by a Pittsburgh mill; also, a building in St. Louis requiring 1,300 tons and one in Boston calling for 500 tons have been placed here. A much increased volume of orders was had during the week. With the livelier market, prices are improving and even at the firmer figures little work will be booked ahead. Angles and universal plates are quoted higher and little cutting is discovered. The price of 1.55c on beams and channels has been reaffirmed. Other prices follow: Universal plates, 1.15c to 1.20c; angles, 1 15c to 1.20c; zees, 1.30c to 1.40c; tees, 1.30c to 1.35c.

BARS.—Both iron and steel material show marked betterment, the latter perhaps being the more active. Buying ahead is being figured on by some concerns that look for higher prices later on. Steel bars are higher in price and mills are holding at 1.10c to 1.15c, although sales are reported at 1.05c. The partial restoration of prices by the Bar Iron Association was not unexpected. We quote all muck bar 1.20c to 1.25c; common, 1.05c to 1.10c; Cleveland and Youngstown, 1.15c.

WROUGHT PIPE.—Merchant pipe shows improvement, but not to the extent of taking the output of the mills. Higher prices are firmly maintained and, taken as a whole, the situation is quite favorable. Pipe line requirements are promised in the near future and some scattered lots are already on the market. Five tens and 5 per cent is the prevailing figure, although five tens is held by some mills. Steel pipe is likewise in better shape, being quoted at six tens. Skelp is in demand again and an occasional sale is noted. We quote: Grooved steel skelp, 1.05c to 1.07½c; sheared, 1.17½c to 1.20c; grooved iron skelp, 1.20c to 1.25c; sheared, 1.30c to 1.35c.

PLATES.—Requirements for 21 locomotives have been placed with a local mill and the market generally shows a much improved condition. Lots of 100 and 200 tons comprise most of the business, which is largely boiler requirements. Higher prices are noted and cutting of quoted rates is not so frequent. Mills are refusing further forward delivery even at advanced prices. We quote: Tank, 1.15c to 1.20c; shell, 1.25c to 1.30c; flange, 1.35c to 1.40c.

MERCHANT STEEL. — An advance in prices ranging from $1 to $2 per ton is being announced by mills generally and a more active market prevails in consequence. Future needs are being covered in the desire to escape higher prices and large contracts are being made. We quote: Soft steel bars, 1.20c; machine straightened tire, 1.40c to 1.45c; spring, 1.30c to 1.35c; machinery, 1.30c to 1.35c; toe calk, 1.50c to 1.60c; sleigh shoe, 1.45c to 1.50c.

SHEETS. — Black sheets are responding to the increased demand and are quoted at higher figures. The volume of business is increasing and the large inquiry gives good indication for the future. Black plates for tinning are reported as unusually active. Both the tin plate and sheet manufacturers' associations are in session here this week. We quote No. 26, 2.10c; No. 27, 2.15c to 2.20c; No. 28, 2.25c to 2.30c. Galvanized sheets continue active in spite of a late season and are stiffening somewhat in quoted rates. Eighty per cent off list is strictly held.

OLD MATERIAL.—A small tonnage of old iron rails is reported sold at $15, which is much in advance of recent quotations. The feeling is strengthened that a material change will be noted in prices on scrap as prospects for business improve. The market is still largely a matter of speculation and attendant circumstances determine selling prices. We quote: Wrought scrap, $11 to $11.50; cast scrap, $10 to $10.25; car wheels, $11.50, gross; old iron rails, $14.50 to $15; old steel rails, $13 to $13.25; coil springs, $10.75 to $11, gross; hammered iron axles, $16 to $16.50, net; rolled iron axles, $14 to $14.50; heavy melting stock, $12.50 to $13; machinery cast, $9.75 to $10.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Philadelphia There is a firmer feeling in all departments of the finished material market, and it is believed that under the new arrangements of the billet pool steel products will command relatively higher prices than heretofore. The mills have more work in hand and there is genuine improvement in the situation. Prices of pig iron are steady, but there is less buying than in the weeks preceding, the requirements for the year being pretty well provided for. Furnaces are not urging sales, having most of their output engaged for some weeks ahead. We quote: Bessemer, $14 to $14.25; No. 1 foundry, standard brands, $12.75 to $13; No. 2 foundry, $12.25 to $12.50; No. 2 plain, $11.50 to $11.75; standard gray forge, $11 to $11.25; ordinary, $10.75. Mill products are steady and on plates and bars from $1 to $2 more than the low October basis is asked. Plates are on a basis of 1.30c to 1.35c for tank, seaboard. For refined bars, 1.20c to 1.25c, car lots, is the market. We quote: Angles, 1.25c to 1.30c; beams and channels, 1.70c to 1.90c. There is more inquiry but buyers and sellers seem apart on the question of prices, the former claiming they are asked to pay too much in view of the low prices on finished material. Old iron rails are $13.50 to $14; steel, $12.50 to $13; old car wheels, $10.75 to $11; old iron axles, $17.25; cast borings, $7.25; wrought turnings, $8.25 to $8.50, the last two having advanced about 25 cents.

Cincinnati. The improvement noted a week ago continues to develop in a healthy way, as an invalid recovers strength after a long sickness. The pig iron business of the week just closed has been marked by no special features beyond an expanded volume of business at steadily advanced prices. Many consumers unable or unwilling to buy speculatively express a willingness to pay the market prices when they need iron, feeling they can secure a corresponding advance for their products when ready to buy. We quote: Southern coke, No. 1 foundry, $10.75 to $11; No. 2, $10.25 to $10.50; No. 3, $9.75 to $10; gray forge, $9.50 to $9.75; mottled, $9.50 to $9.75; No. 1 soft, $10.50 to $10.75; No. 2, $10 to $10.25; Lake Superior coke, No. 1, $12 to $12.50; No. 2, $11.50 to $12; Hanging Rock charcoal, No. 1, $15 to $16; Tennessee Charcoal, No. 1, $13 to $14; Jackson Co. silvery, No. 1, $13.50 to $14; Standard Alabama Car Wheel, $14.75 to 15.50; Tennessee Car Wheel, $13.50 to $14.50; Lake Superior Car Wheel and Malleable, $14.75 to $15.25.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

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THE NEW STEEL BASIS.

The four-days' meeting of the producers of Bessemer steel at New York last week ended in agreement. The test of more than seven months, under conditions calculated to try to the last degree any arrangement designed to prevent demoralization, had brought the association to a parting of the ways. Steel works having billets for their ultimate product found, as was intimated in these columns soon after the pool was formed, that the agreement was depriving them of the business they had built up. Their customers who operated merchant mills could not pay a cent a pound for steel and sell finished material at practically the same price. It may be the fact, as has been alleged in much of the trade discussion of this question, that the smaller mills that bought billets led in the cutting of prices on the finished product, in the first few months after the formation of the pool. Some of them had bought billets at $15 to $16 early in the year and while these contracts lasted were able to cut the then current quotations on steel bars, for example, for the sake of getting an especially desirable order. But whether the big steel makers or the lesser rolling mills took the initiative, the outcome is well known. Business was gradually pinched down by Bryanism, and at length the sales of pool steel were less than sufficient to keep two average converting plants employed. The business in finished material drifted into the hands of the large producers and the smaller concerns shut down their plants and waited.

The policy of the wire nail pool tended to cut consumption of its product down to a minimum, so that few billets were sold to rod mills. With that source of demand cut off, also, there was little left for steel works, after the sheet and tin plate trades had taken their requirements — never large, comparatively speaking—but to turn their blooms into finished material and market all they could in that form.

Another matter that threatened trouble at the New York meeting was the evasion of the spirit of the agreement by selling material of more finished form than the billet, and delivering billets to the buyer, allowing him an agreed amount for converting the steel into the material ostensibly sold.

The outcome of the long session is the adoption of the basis contended for last spring by the mills whose final product is billets. The big producers have made the concession and the amended agreement is now to be tested by the developments of the next few months.

The prime feature of the new arrangement is that it takes account of the output of finishing mills. It may be said to be on a finished material basis, or on an ingot basis, but with no account taken of crop ends or other waste from the ingot, in reporting tonnage, nor of rails nor of steel pipe. A percentage allotment is made, and recasting this on the new basis consumed much time. The total output provided for, outside of the two products named, is 4,800,000 tons a year, or 400,000 tons a month. Sales are to be reported regularly, as heretofore, and if any producer overruns his quota, he is to pay a pool tax of $2 a ton on the excess product. The $2 differential on open-hearth steel is to be maintained, as agreed on at the Cresson meeting. Material exported is to be free from the pool tax.

The proposal to establish prices on all forms of finished material, so that outside mills buying steel could pay the pool price for billets and have a fixed margin, was deemed impracticable. But since there is a limit upon the amount of finished material a pool mill can turn out, without paying the $2 tax, it is presumed that in a time of average demand outside mills will be able to buy pool billets and compete on final products. The supposition is that a pool mill will prefer selling a fair tonnage of billets at $20.25, Pittsburgh, for example, to marketing steel bars, say, at 1c to 1.05c, when all such cheap finished material is charged against its percentage. There is more profit in billets at $20.25 than in finished material at some of the prices named in October, and the tendency now will be, it is presumed, for the large producers to maintain prices nearer to the basis that will permit the outside mills to operate.

A better judgment can be formed of the effect of the new arrangement, after a few months of business under conditions approaching normal. The total of 4,800,000 tons is much more than the country has ever produced in Bessemer ingots in a single year, excepting 1895, when the amount was exceeded by 100,000 tons. It is evident that there must be a very material increase over current consumption before any of the pool members will be in danger of exceeding their allotment. It is to be considered, however, that the total of 4,800,000 includes allotments that are not at all likely to be filled, the plants not having shown records approximating their percentages.

If there were any such demand as was seen in the latter part of the second and through the third quarter of last year, there could be no question of the successful operation of the new arrangement; in fact, the necessity for it would not exist. It is to be expected, however, that with a gradual increase in demand the operations of the pool will be at-

tended with less friction than heretofore, and that in time some of the causes of complaint by steel works that do not finish, and by buyers of billets, may be removed.

The decision to maintain the present price was readily arrived at, once the larger matter at issue was disposed of. If the policy now announced, of holding for higher prices on finished material, notably bars, is adhered to, there may be a period of comparative peace ahead, following which market conditions may be such as to help solve the problem with very little assistance from organization.

DAILY instalments of billet pool matter have been published in the past week, much of it based on misapprehension and in some instances on misstatements. Some of the publications have made it appear that there was much commotion among Cleveland users of steel over the result of the New York meeting. Names have been given in newspaper dispatches sent from Cleveland, of concerns intending to join in a new steel plant project, when the firms either do not roll steel at all or have but a fractional output of material for which they buy billets. It may be stated that there are no plans on foot for additional steel-making capacity in Cleveland, except that on which work was begun a few weeks ago by the Cleveland Steel Co. Much has been made of alleged discrimination against Cleveland consumers of billets. Whatever the grievance in this particular—and there will be a difference of opinion as to the existence of good ground for it—the cause is not to be found in the formation of the billet pool nor in the prices it has maintained. Before the pool was organized the Cleveland price for billets, under ordinary circumstances, was the Pittsburgh price plus the freight of $1.25, Cleveland makers of billets retaining the advantage of their location, in sales made locally. To be sure, this was not inflexibly maintained, outside billet makers, in times of light demand, standing part of the freight to Cleveland, and laying steel down here at less than the Pittsburgh basis with $1.25 added. The billet pool has taken a middle course. Instead of giving Cleveland consumers the Pittsburgh price, on the one hand, or on the other hand giving the Cleveland steel makers the benefit of the freight from Pittsburg, it has added 50 cents to the Pittsburgh price, making Cleveland deliveries $20.75. It was very rarely the case, under the open competition antedating the pool, that steel was delivered in Cleveland as low as 50 cents above the Pittsburgh market price; and industries established in Cleveland under those conditions doubtless understood just what their raw material basis was likely to be and what their competitors in other districts could do. So much should be said in fairness, in view of some of the partial and untrue statements that have been published. Self-interest controls in business, and Cleveland steel producers have probably done what Cleveland buyers of billets would have done had the positions been reversed. The advantages of the Cleveland position for the economical manufacture of steel have been open to all comers all these years, and the existence of the billet agreement has produced no new set of conditions. If prices made by producers of steel in any district are such as to tempt those who have been their customers, to go into steel making on their own account, that contingency doubtless receives due consideration. It is a matter of self-interest in either case, and each side—producer and consumer—is free to adopt the policy that will be profitable to it, all things taken into account.

LAKE SUPERIOR IRON MINES.

It is not the intention of the Lake Superior Consolidated Iron Mines to increase greatly the working force at any of its properties, but the present number of men will be kept employed through the winter months. At the Adams mine 100 men are at work and at the Burt and Hull mines, near Hibbing, about 200. The only new work to be undertaken is stripping at the Mcuntain Iron mine, and this is done principally for the purpose of giving employment to people living in the village of Mountain Iron. There will be very little lumbering this winter, and but for the stripping the problem of maintenance until spring would be a serious one with some of the men.

The Sunday Lake mine at Wakefield, Wis., has resumed with a force of 100 men.

The new Bessemer ore find at the old Mansfield property, in the bed of the river that broke through into the mine four years ago, has been followed for over 1,000 feet. It can be uncovered at small expense, outcropping in many places and elsewhere having only a shallow covering. The possibility of mining witha steam shovel is being canvassed.

Arrangements are being made for the operation of the Atlantic and Pence mines on the Gogebic range, the coming winter. The Franklin group and the Zenith, also under the control of Frank Rockefeller and associates, will also be operated. Work at the Franklin may not begin till the opening of the new year.

The Ætna mine on the Mesabi range, formerly the Lowmoor, is about to change hands. It is said that a Pennsylvania furnace company will acquire it.

At the Tilden mine two steam shovels were at work last week loading 24,000 tons of ore for the final cargoes to be taken from Ashland. No order has been given for resumption, but it is believed the mine will not long be idle. The Palms mine, also at Bessemer, is reported to be working a good force. At Iron Belt the Shores mine now has 50 men at work.

The Pewabic Co. will sink a second shaft on the Walpole property. About 60,000 tons of ore are in sight at the Walpole, the ore averaging 60 per cent in iron and .125 in phosphorus.

The shipments from Ashland this season will be something less than 1,600,000. Last year's record was above 2,000,000 tons.

Gentlemen's Agreement on Tin Plate Restored.

BY TELEGRAPH:

PITTSBURGH, NOV. 19.—The meeting of tin plate manufacturers which has just adjourned was largely attended, and some improvement in business was reported. The "gentlemen's agreement" adopted last February, and of late not well kept, was reaffirmed with some modifications. Bessemer coke plates and cheap terne plates are established on a basis of $3.65 minimum, New York and Pittsburg. The association is stronger than in months. The American Tin Plate Co., of Elwood, Ind., was not represented at the meeting.

THE new Butler & Pittsburgh Railway has purchased a tract of 123 acres of land near Hutton Station on the Allegheny Valley Railroad. A portion of the property, it is said, will be used as a site for car shops. The price paid is given at $73,000.

THE Cleveland Steel Co. has increased its capital stock from $300,000 to $500,000 and will push the additions in the way of crucible steel and acid open-hearth capacity, recently described in these columns.

POSSIBILITIES OF CUPOLA PRACTICE.

Dr. Edward Kirk on the Use of Hot-Blast.

TO THE EDITOR:

The application of hot blast to cupolas—a question recently discussed in your columns—has been thoroughly tried in this country, and in every case has proved a complete failure. Probably one of the most complete hot blast cupola plants ever constructed was that erected many years ago by Jagger, Treadwell & Perry at their stove works, Albany, N. Y. In this case a brick oven was constructed in the rear of the cupola and filled with coils of cast iron pipe, through which the blast was forced before entering the cupola. The oven was connected with the cupola by a brick arch from the top of the cupola to the top of the oven, and the pipes heated by the waste heat from the cupola, which passed down through the oven and out at the bottom into a stack erected alongside the oven. The cupola was a very low one and a large amount of heat escaped which is now utilized by employing high cupolas. The blast was heated in the pipes, before entering the cupola, to a temperature sufficient to melt lead. A considerable saving of fuel was effected. But it was found that the heating and coaling of the pipes day after day caused them to break and the saving of fuel in the cupola was not sufficient to pay for repairing the pipes. After a thorough trial the hot blast was abandoned.

Probably the next most economical means of heating a cupola blast was that tried at the Ransom Stove Works, Albany, N. Y., in which coils of pipe were placed in the cupola stack and the blast passed through them. This arrangement also heated the blast to a high degree, but it had the same objection of pipes breaking. After a section of broken pipe fell upon a melter while chipping out and killed him, the pipes were removed and hot blast abandoned. With the modern furnace, hot blast stove and a low cupola, a hot blast could probably be applied to a cupola, but it is doubtful if the saving effected in fuel or increase of output would justify the expense.

There does not appear to be any chance for any great improvement in cupola construction, for there has been no improvement made in the past twenty years. At the beginning of that period we had the round cupola with a single row of round or flat tuyeres as the best and most economical melter. To-day the same cupola is more extensively used than any other and does the most economical work. During this time many new designs of cupolas have been introduced as fuel savers and economical melters, and some of them came into very general use in certain sections of the country. But they have all proved to be more or less of a failure, and many of the improved cupolas that were considered necessary to the foundry's existence in years past, are now only used to save the expense of replacing them with new ones. The patented cupola of to-day will share the same fate, for the only cupola that has stood the test of time as an economical melter is the plain round cupola with a straight or boshed lining, according to size of cupola.

These cupolas were made very low years ago and the tuyeres placed very high. A proper height for a charging door was considered to be from 8 to 10 feet, and height of tuyeres from 24 to 30 inches. These low cupolas and high tuyeres were a great mistake, and in my work the "Founding of Metals," published in 1877, I strongly advocated increasing the height of a cupola and lowering the tuyeres. The suggestion to increase the height of cupolas has been followed all over the country, and many of the cupolas now in use are double the height of those of the same diameter in use 20 years ago. Tuyeres have generally been placed low in cupolas in the eastern part of the country, but in the West they still use high tuyeres as a rule and almost all of the cupolas manufactured in the West have high tuyeres. Why the designer or builder of a cupola should place the tuyeres high is something I cannot understand, for fuel placed under the tuyeres takes no part in melting except to carry the stock to be melted. Its temperature is below that of the melting zone, and the temperature of the molten iron is reduced by it in its descent to the bottom of the cupola. Iron can be kept hotter in a ladle than in a cupola and every pound of unnecessary fuel placed under the tuyeres is a waste that can be prevented by placing tuyeres low.

I think the greatest chance for improvement in melting is in cupola management. In the majority of foundries there is no system whatever about melting. Cupolas are placed in charge of incompetent men who have no system about doing their work, and more poor melting can be traced to this cause than to poor cupolas.

EDWARD KIRK.

PHILADELPHIA, NOV. 14.

The Real Need in Cupola Practice is Brains.

TO THE EDITOR:

The question asked by *The Iron Trade Review*, "In what direction is there greatest room for improvement in cupola practice?" is one difficult to answer with any degree of application to all foundries, for special conditions and special necessities regulate almost every individual concern. Every foundry desires some particular improvement in cupola practice to conform to the quality of work it is making, or the manner in which it runs its heats.

The foundry that is located a long distance from fuel, where the cost of transportation is heavy, feels that the greatest economy possible for it, is in the reduced amount of fuel used; while the foundry situated close to the coke regions does not regard this as valuable an item as others. Some foundries can run their cupolas for hours and find no objection to the time consumed in taking off a heat, while others find it decidedly to their interest to melt as quickly as possible. The suggestion of low tuyeres, to reduce the amount of fuel in the bed is good in some cases; but again, there are reasons often for wishing to have a cupola hold a good top of iron. And so we meet with every condition. An objection by some to a hot blast would be its expensive continuous melting interferes with the molders. Low tuyeres interfere with proper mixture of irons. And so on through the entire list of improvements.

But if the question could be answered in one sentence, it would be this: More brains on the charging scaffold. Many old-style cupolas are doing as well if not better than many patent ones, simply through skillful manipulation, and the first thing of importance in improving our cupola practice is for the foundry foreman first to master the principles of melting, and next to place cupolas in charge of men who are intelligent and capable of using their own brains. Ordinarily the cupola tender is regarded as a simple laborer, and his position one that any man can fill who is strong enough to shovel coke and handle pig iron. But it should not be so. He should be a man selected with care, well taught, and paid sufficient wages to insure his strict application to his duty. This method followed out will give better results in the foundry than any proposed reform.

An ideal cupola, from a foundryman's point of view, would be something on the order of an air furnace, where all the iron could be melted at once and a perfect mixture obtained and the iron made ready for use in any quantity at the option of the molder. This brings us to the possible plan proposed by Mr. Ferguson—melting by electricity.

There are numberlesss devices to improve cupolas—center tuyeres and tuyeres of every shape and description; but rarely do any of these improve to any extent on the old style cupola when it is handled by competent men. And this consideration brings us back to a realization of the fact that the first thing necessary in good cupola practice is brains.

HERBERT M. RAMP.

SPRINGFIELD, MO., NOV. 12.

THE Chicago Shipbuilding Co. has closed contracts for three new steel vessels—two steamers and a tow barge—the aggregate cost of which will be close to $400,000. Work on the new boats is to be commenced immediately, and it is expected they will be launched not later than June 1, next. The steamers are to be built for R. R. Rhodes, of Cleveland. They will be 240 feet in length, 42 feet beam, and their molded depth will be 24 feet. Their engines are to be triple expansion. The cost of the new boats complete will be $125,000 each. The tow barge, for the construction of which a contract has been closed with the Elphicke-Orr syndicate, is to be a duplicate of the tow barge Aurania. It will be 352 feet long on the keel, 44 feet beam, and 26 feet molded depth, and will cost about $130,000. The Cleveland Shipbuilding Co. will furnish the boilers and engines.

THE BOTTOM OF A FOUNDRY CUPOLA.

Considerable space in your valuable paper has been given (and wisely, in my opinion,) to discussions to the best methods of charging cupolas, size and location of tuyeres, as to height, pressure of blast, to obtain the best results etc.; but I have never noticed mention of how the sand bottom should be treated. This is an important feature in cupola management, and can cause a great deal of trouble if not properly attended to.

If it is not encroaching on your valuable space, I will relate an experience I was once shopmate with. A number of years since in a leading foundry in New England where I got employment, it was almost a daily occurrence to have a leak in the bottom of the cupola; in other words, the hot metal cut through the bottom. I can see the foreman now, complacently seated on the end of a many-scarred plank, with a wooden made-on-purpose horse for a fulcrum, and a large poultice of clay on the opposite short end of the plank, pressed up hard against the wound made by the hot metal, that had cut through sand and iron doors.

The first day of my advent in that foundry, a run-out in the cupola bottom occurred. In most foundries this accident is rare, and when it does occur, it is conducive to considerable excitement, attended, ofttimes, as the French say, with features "comique"—for every man's and boy's soul is in arms and eager for the fray; each one feels that he, and he alone, knows how to stop it, or at least will feel guilty if he don't do something. So orders are hurriedly and vociferously given and jostle into the narrow cupola room, some with bucket without water, others with shovelfuls of sand, which is vainly thrown at the leak. Others, putting large pieces of clay onto rammers, start for the leak. The fellow with empty bucket has discovered that fact and starts to fill it with water, collides with the men with the clay-loaded rammers, and knocks the clay off. Meantime, from a small it has grown to a large leak; the hot metal accumulates under the cupola, with rapidly increasing radiating surface.

By this time the empty bucket comes back full of water and, with more zeal than judgment, is heroically thrown at the leak. Of course, it misses the leak, but is a "howling success" in coming "kerplump" on top of the pool of hot iron, and the leak stoppers are nearly suffocated with scalding steam. This is the average scene where such leaks are rare.

But I discovered that stopping leaks in a cupola bottom was susceptible of being systematized, in fact, could be made artistic as to method of stoppage. When this particular leak broke loose, the foreman resignedly stopped the blast, told the melter to draw off all the iron he could save, went deliberately to the rear of the cupola room, took a plank and the before-mentioned wooden horse, put horse and plank in place and called to the melter for the mud. The melter produced a cheese-shaped cake of stiff clay, kept in a damp box, in "stock;" it was pressed up against the leak; foreman sat down leisurely on the long end of plank; the melter covered the hot iron with sand, got under cupola, tucked up the clay with a hammer, nice and neat, and sang out "All right; let her go!" And we went, as if nothing very unusual had happened; and on inquiry I learned there was nothing unusual about it, as it was considered a pretty lucky heat if she didn't "leak in her bottom," as the melter expressed it, so they were always prepared for emergencies.

A few days later the tuyeres bunged up when the heat was half over, and we had to drop the bottom. Shortly after, a shopmate asked if I ever saw a cupola full of boiling water. On looking in the charging door, there it was, sure, full to the door, a veritable volcano, a rare and unusual sight to see. The charge had hung up, and water was introduced to shrink things, so it would drop; but it had to be taken out the same way it went in that day.

I had given considerable attention to cupola practice, and while I had never been shopmate before with this kind of accident, I thought I knew their cause and prevention. In order to be certain and have my suspicions confirmed, the melter was requested to let me see him prepare his cupola, as I wanted to learn that trick, as it was a pretty good thing to know how to do. After the bottom doors were up, he put in about two and one-half barrows of new fine molding sand; then got inside, with a heavy rammer. He pounded the three and one-half or four inches of sand so hard that every blow could be heard all over the shop; then came outside and luted with soft clay every crack and crevice around the bottom, and finished the thing off by throwing a bucket of water in the breast opening. There was a beautiful leak that day. The melter informed me in a confidential whisper, that he must have missed some place when he calked her up, and he gave me a knowing "Don't-give-me-away" nod and wink.

After a few days' deliberation as to how, if kindly or otherwise, instruction would be received, I asked the melter if he would like to learn how to prepare his cupola so that leaks would be rare, if ever; also how to prevent the tuyeres from getting bunged or closed up early in the heat, and various other troubles he seemed to be beset with. He assured me he would, and that he had never been told a thing, "and the Lord knows I am doin' me livil best." "Then," said I, "when you put in the next bottom, get the sand from the cinders tumbling mill—if there are cinders in it, it will not harm it, but make it more open; put very little water it, but temper it even; have it like damp ashes. Before going into the cupola take that heavy rammer and throw it in the river or some where where it will never get into the cupola unless on top of the fuel, through the charging door. When you get inside, to dress the sand, tuck it evenly all around the outside with the ends of your fingers; then tread the sand all over, evenly and smoothly; it will be firm enough. Never put mud on the bricks over one and a half inches thick, no matter how much burned out; if much thicker, it will not dry through before the wind goes on; and if not dry, it will flake off, from the steam forcing it off, and be converted into slag to plague away and help bung up the tuyeres. Put the breast in arching, both inside and out; do not have it over two inches thick, through tapping hole; one and one half inches are better, if you are careful the first two or three taps. If you follow these instructions, you will avoid most, if not all, the important troubles you are now suffering from. You have been making the bottoms hard, of close sand, and wet; thus stopping up every crack on the outside to prevent the steam from escaping, and it forced the sand away, by boiling the iron until the bottom doors came in contact with the melted iron, and it cut through. The tuyeres bung up from the same cause. You hold the cupola until you have some metal accumulated; the tuyeres are quite low; the liquid iron is agitated, thrashes around from the bottom being too hard and too much wet mud on the sides, comes in contact with the spent fuel around tuyeres, congeals, bungs up tuyers, and here you are again."

The sand bottom of a cupola should be made, as far as density is concerned, the same as a mold, so metal will lie quietly on it. The dryer and more open the sand is, if trod in evenly, the better it is prepared for the purpose. The metal will put a skin on it, so it will not move.

That plank and wooden horse became very much in the way in a few weeks, and were finally consigned outdoors; there was no more use for them while I remained, and if afterwards, I never heard of it. The foreman informed me just before I left that they had "had first-class luck with the cupola lately."—[L. C. Jewett, Boston, in American Machinist.

"Tables for Iron Analysis," by John A. Allen, published by John Wiley & Sons, New York, is just from the press. The volume, which has 85 pages, and is well bound in cloth, is given up to tables of converting weights of various elements and their combinations. The author says that when he began this work in 1892, he chose the atomic weights recommended by the latest scientific authorities in preference to those generally used at that time by furnace chemists, but that the only serious discrepancy was in the weights assigned to magnesium and silicon.

The Osborn Mfg. Co., of Cleveland, O,, maker of brushes and brooms, foundry supplies and hardware specialties, has just made a large addition to its factory, giving more space and better facilities for conducting the business. The business of this company has continued to grow in the past few years, and with more room and a number of new specialties in foundry and hardware lines, ready to come on the market, a continued advance in its affairs may be looked for, as general conditions improve.

CONDITION OF BLAST FURNACES OF U. S.*

Nov. 1, 1896.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New York	20	2	2580	18	11187	5	1	112	4	440
New Jersey	8	1	698	7	3251	....	....	....	....	....
Spiegel	3	1	167	2	147	....	....	....	....	....
Pennsylvania:						13	1	60	12	685
Lehigh Valley	37	11	6083	26	10807	....	....	....	....	....
Spiegel	1	1	70	0	0	....	....	....	....	....
Schuylkill Valley	24	7	4136	17	8954	....	....	....	....	....
Upper Susqu. Val	8	2	1618	6	2398	....	....	....	....	....
Lower Susqu. Val	9	3	1034	6	3252	....	....	....	....	....
Spiegel	1	0	0	1	450	....	....	....	....	....
Lebanon Valley	13	4	2600	9	5359	....	....	....	....	....
Pittsburgh	27	19	40088	8	11133	....	....	....	....	....
Spiegel	1	1	668	0	0	....	....	....	....	....
Shenango Valley	17	2	2910	15	14413	....	....	....	....	....
Jun. and Con. Vals	12	4	3855	8	6401	....	....	....	....	....
Spiegel	1	1	400	0	0	....	....	....	....	....
Youghiogheny Val	3	0	0	3	4050	....	....	....	....	....
Miscellaneous	4	1	500	3	2079	....	....	....	....	....
Maryland	5	0	0	5	7330	4	2	215	2	395
Wheeling District	9	0	0	9	10559	....	....	....	....	....
Ohio:						9	3	196	6	635
Mahoning Valley	12	3	4136	9	10415	....	....	....	....	....
Central & Northern	9	5	6246	4	6443	....	....	....	....	....
Hocking Valley	12	0	0	12	5145	....	....	....	....	....
Hanging Rock	12	5	1130	7	2913	....	....	....	....	....
Indiana	2	0	0	2	408	....	....	....	....	....
Illinois	16	7	11975	9	13350	....	....	....	....	....
Spiegel	1	0	0	1	1000	....	....	....	....	....
Minnesota	1	0	0	1	629	....	....	....	....	....
Wisconsin	4	1	789	3	3081	2	1	800	1	306
Missouri	3	0	0	3	1935	1	1	338	0	0
Colorado	3	0	0	3	2200	....	....	....	....	....
Virginia	23	9	5864	14	8549	13	1	48	12	780
Kentucky	6	3	986	3	2400	3	0	0	3	200
Alabama	39	15	17351	24	15212	12	1	279	11	2594
Michigan	....	....	....	....	....	16	6	2271	10	3998
Tennessee	13	4	3390	9	6340	9	2	421	7	2210
Georgia	2	0	0	2	969	3	1	280	2	360
North Carolina	2	0	0	2	797	....	....	....	....	....
New England	....	....	....	....	....	11	1	63	10	975
Texas	....	....	....	....	....	4	0	0	4	950
Washington	....	....	....	....	....	1	0	0	1	175
Oregon	....	....	....	....	....	1	0	0	1	275
Totals	363	112	119094	251	182556	107	21	5083	86	17888

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	21	24	24	5,083	6,562	5,179	86	89	17,888	13,627
Coke and Anthracite	112	106	215	119,094	106,220	212,127	251	275	182,556	195,482
Total	133	130	239	124,177	112 782	217,306	337	364	200,444	209,109

*The above table is coudensed from the *Iron Age*. The tables of the *American Manufacturer* show in blast Nov. 1, 133 furnaces, with 126,956 tons weekly capacity instead of 124,177 as above.

Obituary.

Malcolm W. Leech, of Pittsburgh, secretary of Kirkpatrick & Co., Ltd., whose works are at Cranegie, and treasurer of the Chartiers Iron & Steel Co., whose plant is at Leechburg, died on Sunday, Nov. 15. Mr. Leech was 37 years old, and had lived in Pittsburgh all his life. He had been identified with Kirkpatrick & Co. for 10 years. He contracted a severe cold some weeks ago, and undue exposure on election day brought on pneumonia.

John McMurdie, traveling salesman for Rogers, Brown & Warner, the Philadelphia branch of Rogers, Brown & Co., was found dead in bed at Lancaster, Pa., Nov. 14. Death is thought to have been caused by heart trouble.

James McMillen, resident director of the Cambria Iron Co., died at his home in Johnstown, Pa., Nov. 3, after a long illness, aged 74 years. When the founders of the Cambria Iron Co. went to Johnstown in 1852 to select a site, Mr. McMillen kept the only hotel in the place. It was while the directors stopped at his hotel that he became interested in the Cambria works. He was resident director of the company for a number of years and a heavy stockholder.

REDUCING LOSS OF BLAST FURNACE HEAT.

Adolf Wolski, a metallurgist of Kouskie in Russian Poland, writing in *Stahl und Eisen* expresses the opinion that present day blast furnace practice, with highly-heated and compressed blast, rich charges, and accelerated working, belongs to those technical processes which appear to have reached an almost ideal state of completeness; but this, he asserts, can only truly be said of the method of transferring the heat from the gases to the charge, for in regard to the utilization of the heat-energy contained in the fuel much has yet to be learned, and for improvements in this direction there is still, the author says, a very wide and remunerative field open. In view of the comparatively high price of fuel, it is a matter of great importance to the blast-furnace owner not only to effect a saving in fuel, but also to be able to use the various kinds of fuel; and for this reason Mr. Wolski has formulated proposals for blast funaces with self-regeneration of the gases.

Recently various proposals have been made for remedying the defects which the present day blast furnace possesses, and he mentions the following five: 1. A. Sattmann and A. Homatsch—Process for the production of pig iron, refined pig iron, and remelted iron. 2. Georg Günther—A new reduction and smelting furnace. 3. F. Ross—Improvements in furnaces, such as cupola and blast furnaces. 4. J. Gill—Improvements in blast furnaces and in gas producers and tuyeres connected therewith. 5. W. Aleksandrow—How to save the 15,000,000 roubles which yearly escape into the air from blast furnaces, or a proposal for the alteration of the present form of blast furnaces. (St. Petersburg, 1895.)

Full consideration, however, Mr. Wolski thinks, is only deserved by the first two systems, the last three being based more or less, upon a misapprehension. Sattmann and Homatsch are connected with the Donawitz Iron Works, in Styria, and they propose to obtain gas from the local lignite; and they recommend various styles of furnaces. Günther is connected with the Friedenshütte in Silesia. According to his method the ore, after roasting, is, if necessary, pulverized and mixed with pulverized fuel (raw pit coal), and then reduced in furnaces resembling coke ovens, whence it is ultimately transferred to a kind of cupola furnace. Mr. Wolski holds this system to be a rather difficult one in practice.

The author does not agree with Dr. Wedding in his views as to the heat radiation of American blast furnaces, and he is of opinion that all the possible progress in present day blast furnace practice must in the end be based upon a diminution of the loss of heat through wall radiation. In support of this view he gives comparative particulars of some blast furnace working in Russian Poland, including illustrations of two charcoal blast furnaces at Stomporkoff, the results of which, he argues, easily manifest the degree in which the restriction of the loss of heat through wall radiation favorably affects the fuel consumption. Mr. Wolski promises further details of his system shortly.

Personal.

Thos. D. West's good service in the sound money campaign at Sharon and Sharpsville, Pa., as president of the Sharpsville Republican Club, was doubly recognized last week. In connection with the presentation of a flag by Sharon Republicans to the Sharpsville Republican Club, a gold-headed cane was given Mr. West by his associates in the club and his zeal and activity were warmly commended. Later a delegation of Sharon business men called on Mr. West and presented a handsome clock.

Jeremiah Head, of London, consulting engineer of the Otis Steel Co., is in Cleveland superintending the erection of new open-hearth furnaces and other improvements.

F. H. Kindl, structural engineer of the Carnegie Steel Co., Ltd., has been appointed chief engineer, vice A. F. Brown, resigned.

S. P. Austin, late of the Pittsburg *Times*, has assumed the post of managing editor on the *Commoner and Glassworker*.

Geo. G. Brown, district manager of the Guarantors' Liability Indemnity Co., has opened offices at 911 Tradesmen's Building, Pittsburg.

Ensign D. W. Blaner has been detached from duty as assistant inspector of steel at the Homestead Steel Works and ordered to similar service at South Bethlehem, Pa.

EUROPEAN PRACTICE IN STEAM BOILERS.

The report of Mr. R. S. Hale, expert, to the Steam Users' Association, on steam boiler practice in Europe, is a valuable document, containing the personal observations of a practical man. The substance of Mr. Hale's conclusions is given by the *Scientific American:*

The standard type of boiler, with one or two exceptions, is "the internally fired flue boiler," of which there are two types—the Lancashire boiler, with two flues, and the Cornish with one. It is generally about 7½ feet in diameter and 30 feet long, with a grate 6 feet in length, and provides 36 square feet of grate and 1,000 square feet of heating surface. As built in England to carry say 160 pounds pressure, it costs $2,500, and will deliver 6,000 pounds of steam per hour. Used with an economizer and worked at a lower rate, it is "as economical as any type of boiler." In France and Elsass (Alsace), Germany, a type known as the "elephant" is standard. This is classed under the head of externally fired cylindrical in Mr. Hiller's table given below. It is not as regular in size or proportion as the Lancashire. The upper shell is generally from 20 to 30 feet long and some 5 feet in diameter. The two lower shells, called "bouilleurs," are about 2 feet in diameter. They have one and sometimes two connections to the main shell. This boiler has the advantage of allowing a very large grate surface, an important consideration with the poor coals in use on the Continent.

PER CENT OF BOILERS OF VARIOUS TYPES USED IN EUROPE.

	United Kingdom. 1895.	France. 1893-4.	Germany. 1893-4.	Switzerland 1893-4	Austria. 1893-4.
Lancashire and similar types	38.0	4.7	35.7	19.6	*
Cornish and similar types	23.7	8.2	15.3	40.8	*
Externally fired cylindrical†	6.8	57.3	14.8	15.5	41.0
Externally fired multitubular	.....	13.4	5.2	3.5	7.5
Locomotive	11.0	5.1	17.3	5.7	10.5
Small verticals	16.6	3.6	5.0	13.5	6.1
Water tubes	1.8	5.7	4.6	1.4	3.8
Other types	2.1	2.0	2.1	.....	1.4
Total	100.0	100.0	100.0	100.0	100.0

*Lancashire, Cornish and similar types, 29.7.
†Including elephant.

In boiler construction Mr. Hale "judges the English workmanship to be fully equal to our best." The plates are planed on the edges, drilled in place and no punching is allowed, and steel is almost exclusively used. The longitudinal seam of the flues is generally welded, and corrugated flues are frequently used, though "most frequently the improvement did not" appear to "warrant the expense." As compared to 140 to 150 pounds pressure for a new mill in America, 200 pounds would be the practice in England, 180 in Alsace and 140 to 150 in Belgium and Germany.

Economizers are more common in Europe than here, the type known as the "Green" being standard." The most general practice is to put one economizer for each battery of boilers, making the economizer heating surface and the boiler heating surface the same. In Belgium, however, they are recommending one small economizer to each boiler. Scrapers are used to keep the fire surfaces clear of soot. The water surfaces are subject to scaling if the water be bad, and it is chiefly in the bad water districts that economizers are not used, though they are not much, if any worse, in this respect than water tube boilers. But when the economizers are taken out the heating surface of the boilers must be more than doubled to get the same economy." An advantage claimed for the Lancashire boiler and for the economizers is that the large amount of hot water in them affords a reserve of heat for a sudden call. An interesting application of this principle is the feed storage and steam storage system of D. Halpin, of London. It consists in providing tanks in which the feed is heated to the steam temperature by steam from the boiler during light demand, so that during the heavy demand the feed water is supplied hot (360 degrees F. instead of 100 or 200 degrees). The steam storage consists in having very high pressure boilers, which pressure is reduced at the engine. The system, however, did not impress the writer favorably, for the reason that coal can probably be saved equally well by using high pressure steam directly at the engine.

The use of superheated steam is very much in the air all over Europe. There has never been any doubt that it saved from 10 to 20 per cent of the coal; but there has been difficulty in lubricating the engine cylinder and in keeping the many superheated joints tight. The difficulty in lubrication is met by using a high grade mineral oil.

The grates in ordinary use resemble those in America. In Germany some of the under-fired boilers are provided with grates that incline downward to the rear as much as a foot or a foot and a half, which is thought to be easier for the firemen and to give better combustion.

Mechanical stokers are used in probably over one fourth of the boilers in En land. They may be divided into two classes: The coking and the sprinkling stokers. The first feed the coal at the front where it cokes, and is then carried to the rear by the reciprocating motion of the grate bars. The sprinkling stokers throw the coal over the grates by means of revolving or oscillating shovels. The Vicars is the best known coking stoker and the Bennis is the most widely used sprinkling stoker.

Opinion as to the value of mechanical stokers is divided, but the drift of opinion is as follows: "No stoker absolutely prevents smoke, but both types very largely diminish it. In this respect the coking stoker has a decided advantage over the sprinkling. Neither stoker keeps up the steam pressure on a sudden call as well as hand firing; in this respect the sprinkling stoker is considered to act more quickly than the coking." Opinion as to whether they saved coal is divided, the chief reasons for the adoption being the diminution of smoke and the use of a cheaper fuel. "It is thought that stokers and coal handling appliances together save about one-third of the boiler room labor in large plants."

Boiler fittings in Europe differ considerably from ours. They are "heavier and stronger." Springloaded safety valves are regarded with distrust, the common types being the lever and the dead-weight valves. Two gauge glasses are used instead of try-cocks, the use of which has been "entirely given up." The dampers are of the sliding and not the butterfly type, and are always regulated by hand. The various forms of artificial draft are "no more and no less in use than with us." The water gauges are usually covered by guards.

"The average quality of the boiler and pipe coverings did not seem to the writer as good as those in general use in this country. Occasionally he saw wood and even rope covering on high pressure piping some of which was already distinctly charred. Some plants, of course, had very good coverings, and there was a custom of covering the top of the boilers very thickly with some cheap covering, with the result that nine times out of ten the space over the boilers was noticeably cooler than it is in America." The variety in sizes and theories with regard to chimneys is as great in Europe as here. In boiler operation Mr. Hale observed that occasionally the admission of air above the fire at the door or at the bridges was practiced with the idea of diminishing smoke. The drift of opinion was that this resulted in a slight loss of fuel. Boiler surfaces are kept cleaner. When the specific gravity of the water is 1.005 they blow out and clean the boiler. Soda, lime, and potash are used in England, and they are beginning to "know about the advantages of kerosene on the Continent." Purifying plants "are not infrequent."

"Boiler testing is in some respects more advanced than with us, chiefly in that they attempt to tell where all the heat supplied goes to, and thus to determine the reasons of good and bad performance." The bomb calorimeter is used for determining the heat value of a coal. The Thompson and other calorimeters of that type are not considered in the least available for practical work. Coal tests are compared on the evaporation per pound of coal, boiler tests were generally compared on the evaporation per pound of coal "pure and dry," dry referring, of course, to the moisture correction, pure to a correction of the earthy matter contained in the coal, but not allowing any correction for the unburned coal in the ashes.

"In boiler economy I could not see that they were ahead or behind us; they got 60 per cent to 80 per cent of the heat in the coal, according to their air supply and evaporation per square foot of heating surface." The European engineers were fully alive to the "immense importance of the air supply, as compared with any other factor in boiler economy." It has been found that economy is modified by the air which leaks through the settings of some types of boilers; and in some places they were using heavy tar paint or even sheet iron casings to make the settings air tight.

WHEEL CASTING AND LIGHT CRANES.

We are indebted to the *Railway Review* for the following, on the use of light cranes in car-wheel foundries, and for the the illustrations which accompany the article:

The wheel foundry is naturally important to railways, but the art of wheel making has reached the stage at which most railways find it cheaper and more convenient to buy wheels than to manufacture them. The manufacturers all give a guarantee as to service and take scrap wheels in exchange for new ones, and as the prices have been cut down to an almost ruinously low figure, and the railways are relieved from the foundry loss, which can easily run up to a high percentage, it would seem that the railways are pursuing a wise course so long as the manufacturers do not cut the prices so low as to make it impossible to furnish good wheels, and at the present time they seem to be on somewhat shaky ground in this respect.

In laying out wheel foundry floors, one of two systems is used as shown in Figs. 1 and 2. In the system shown in Fig. 1 the chills are arranged in a circle and are served by a jib crane in the center. The system as shown here is designed for the use of the contracting chill, and therefore the steam and water pipes used with that form of chill are shown. The

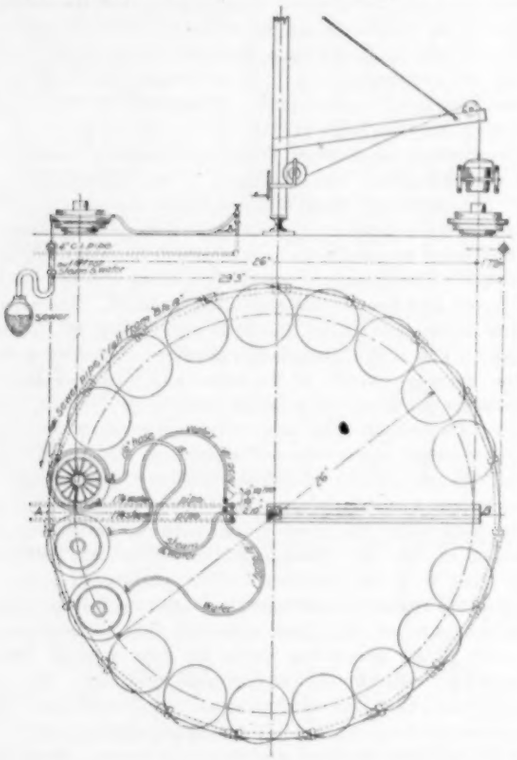


FIG. 1.

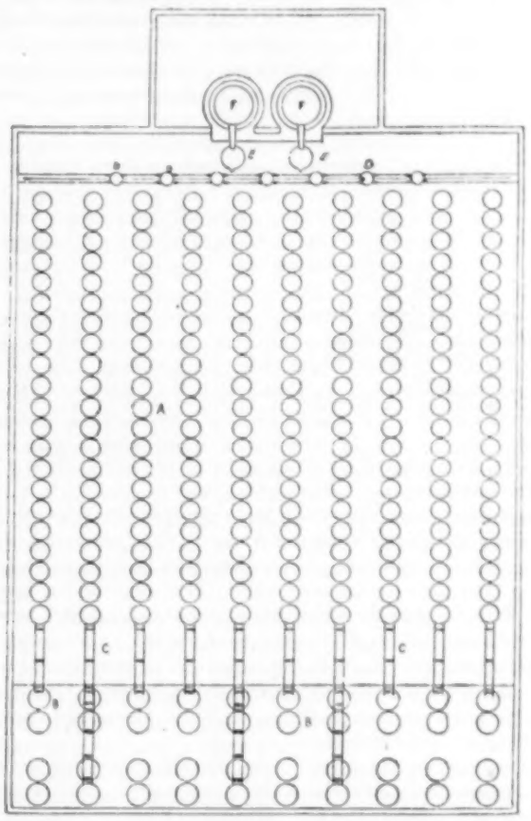


FIG. 2.

WHEEL CASTING AND LIGHT CRANES.

chills, flasks, ladles and wheels are handled by the crane when on the floor, but they must all be carried to and from the floor on cars or trucks. This system necessitates a large area of unoccupied space and therefore requires a larger building than the system shown in Fig. 2 for turning out an equal number of wheels. With the latter system the chills are arranged in rows and are handled by a carrier system, which is illustrated in Figs. 3 and 4. The carrier is rope driven and consists essentially of a carriage, N, Fig. 4, which travels on a track, P, the latter being located directly above the row of chills which it is intended to serve. The movements of the carriage and also the lowering and hoisting of the block are controlled by means of a wire rope which extends over the whole length of the foundry at the line of chills. When pouring, the ladles are carried on a series of small cars, D, Fig. 2, which are connected by wire ropes and after being filled are by a momevent of a lever, G, Fig. 3, moved along the end of the floor until opposite the line of chills, where they are wanted. When in this location they may be reached by the carrier, hoisted, carried to the proper chill and there, by attaching handles, may be poured. The annealing pits, B, are arranged across the end of the foundry, and the wheels are carried to them from the floors by means of the same carriers.

This is known as the Whiting system and over 150 of the travelers described have been put in by the Whiting Foundry Equipment Co. and are handling an average daily output of over 3,000 car wheels. It will be noted that all lifting and moving of flasks, ladles and wheels is done entirely by power, and this has made it possible to reduce the foundry force to one molder and one helper to each floor of twenty wheels, and these with one man to tend the cupola, one man to attend to the pitting of the wheels and the removal of the cold ones, one boy to handle the pitting cranes, make a total of two men and two boys as the entire foundry force in addition to the molders and their helpers. Besides the small number of men required for operating the system it has the advantage of occupying a very small amount of floor space in proportion to the output. This is a very important item where ground is high priced and where it is desirable to invest only a small sum in buildings. The amount of space required for a plant having a daily capacity of 210 wheels is about 10,800 square feet on this system, while with a jib crane system such as that shown in Fig. 1 16,280 square feet would be required for a plant capable of turning out 200 wheels per day. The jib crane system, however,, has one great advantage over the other as it is usually installed, resulting in an arrangement of a foundry which is much lighter and free from dirt, smoke and gases, but there is no reason why a foundry having the traveler system should not be satisfactory in this regard if the necessary floor space be given it.

In foundry cranes the variety of styles and designs is legion. No modern foundry where heavy work is handled is now considered complete without an electric traveling crane, but as this type of crane is also used about machine shops it will be described in connection with that department and at this time only a few types of hand power cranes will be given as shown in Fig. 2.

In the illustration Fig. 5, the crane marked No. 150 shows the most common type of variable radius, single braced, steel frame crane having hoisting and racking gearing. This is probably the cheapest form of crane in use and is one which may be adapted to nearly all localities and classes of work. No. 129 shows the same type of crane in the pillar form which is supported entirely from beneath and is adapted for use in buildings where it is not convenient to support the top of the crane, and it is used also for outdoor work. The support consists of a heavy iron pillar firmly secured by a substantial

foundation which extends up inside the mast. No. 170 and 180 show a light and heavy design of a triple braced crane which is used in locations where ample head room is required and also where a long reach is desirable. Hoisting and racking gears are shown on these cranes.

No. 68 shows a top braced jib crane which is a type used where a perfectly clear space is desired under the arm. This is a more expensive crane than either of the others shown, and requires a much higher point of support. This illustration shows a wooden crane, but the same design is made in steel and is of course much stronger and more durable when built of this material. In No. 46 will be found a type of crane which can be built at perhaps lower first cost than any other form in use. It is built of wood and is usually employed only for temporary work, or where first cost is more important than economical service. For permanent and economical work the design shown in No. 150 is always better in the long run. No. 191 shows a counterbalanced hand power locomotive crane, which is the simplest form of one of the most useful machines which can be put in a yard where heavy flasks or castings are to be handled. The frame and trucks of this crane are of steel and the machine can be equipped with either a boiler and steam engines or with electric motors for furnishing power for propelling the car and for raising and lowering loads. This design may be built to suit any gage of track and of almost any power. No. 130 shows a column jib crane with a single braced frame which is a type brought into use by the prevalence of shops having high roofs. This crane is designed to swing around one of the columns which support the roof. The column is turned at the points of bearing and the crane turns on anti-friction rollers. Triple braced and top braced frames are also employed for this style of crane. This type is largely used in wings and lean-tos of large shops having traveling cranes and it commands portions of the floor which cannot be reached by the traveling crane. Nearly all of these cranes can be equipped with steam, electric, pneumatic or hydraulic operating attachments, and where a large amount of work must be handled, such attachments are always economical.

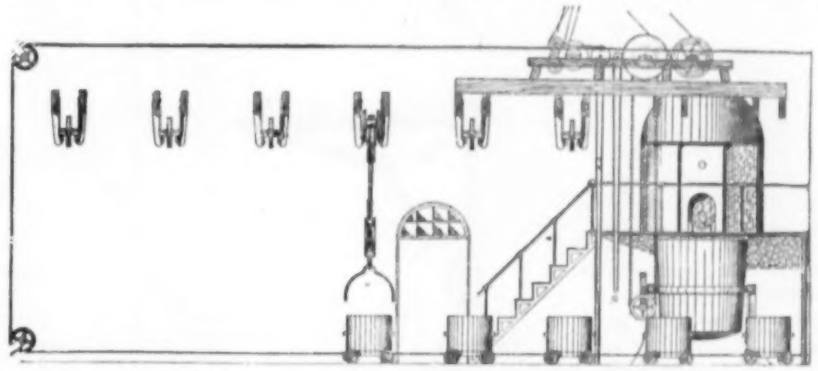


FIG. 3.

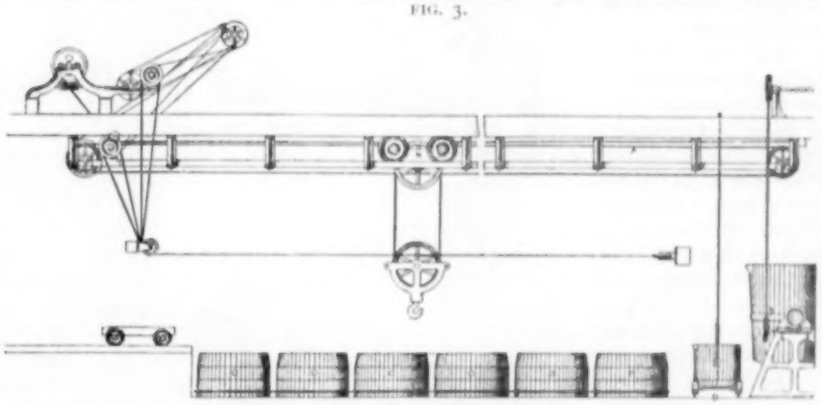


FIG. 4.—WHEEL CASTING AND LIGHT CRANES.

Experiments with Lubricants.

At the sixth annual or thirty-second meeting of the American Society of Mechanical Engineers, held at the rooms of the society in New York City, in December, 1895, Mr. Albert Kingsbury, Durham, N. H., had a paper on "Experiments on the Friction of Screws." The tests were made by the aid of a specially designed machine built at the New Hampshire College shops. It now forms a part of the laboratory equipment of the college.

The author did not consider that the tests showed that any one of the metals developed less friction than any of the others, but the tests are specially interesting because of the great lessening of friction by means of graphite, as will be shown by the following:

Lubricator.	*Minimum.*	*Maximum.*	*Mean.*
Lard Oil	.09	.25	.11
Heavy Machinery.			
Oil, (Mineral)	.11	.19	.143
Heavy Machinery.			
Oil and Graphite	.03	.15	.07
(Equal Volumes.)			

Mr. Kingsbury was complimented by Professor Thurston for the work he had accomplished. Personally, Professor Thurston had found that sperm oil was better than lard oil for reducing friction in such instances. Mr. Kingsbury, in reply to a question, said that the graphite used was from the Joseph Dixon Crucible Co., Jersey City, N. J. He added that he had tried to purify the graphite, but there was no gain. In order to satisfactorily employ the graphite, the fit must be loose.

Some years ago, when Professor Thurston was connected with Stevens Institute, he made a series of experiments to determine with scientific accuracy the value of graphite as a lubricant. He found that under the same number of pounds pressure, and traveling at the same rate of speed, the bearings lubricated with the graphite mentioned above mixed with enough water to distribute it over the bearings, did nearly three times more work than the best quality of winter sperm oil. He also found that when 15 per cent, by weight, of graphite was added to the best quality of lubricating grease, he was able to run the bearings nearly six times longer, at the same high rate of speed, than when the bearings were lubricated with the same grease without the addition of graphite. Where the graphite was used there was no cutting and the bearings were in perfect condition.

Scaffolding in the Blast Furnace.

In a recent article in the *Engineering and Mining Journal* going quite thoroughly into a discussion of the causes of hanging in the blast furnace, Mr. E. Bernard makes the following suggestions as to methods of handling obstructions:

"There are two ways of freeing a furnace which is obstructed: By blowing at the boshes, toward the breast, by one or more relief tuyeres. Combustion and fusion are effected in the agglomerated mass, which becomes loosened and soon falls down. A more general method consists in

blowing as violently as possible into the crucible, open at the tap hole, and then stopping the blast abruptly. This operation, if repeated several times, frequently causes the suspended matters to descend. The colder the blast, the more rapid is the effect; the pasty agglomeration cools and solidifies while contracting and loosening. Obstructions, in fact, appear to last a specially long time if one persists in applying the hot blast."

Commenting on the article, a correspondent from Vulcan, Mich., says in the same journal: "An experience of eight years with blast furnaces led the writer to the conclusion that in a case of scaffolding, the first thing to try, as soon as pressure becomes excessive, is to throw off the blast, repeating until the furnace is free or you are satisfied this will not correct the trouble. Then the next best thing is to throw off the blast and let the furnace stand idle a shorter or longer time, as the case seems to be more or less serious. A stoppage of 15 minutes will often be sufficient, and on starting again the pressure will be found normal. At other times a considerably longer stop may be necessary. A result of stopping is the reduction of temperature and pressure in the upper part of the furnace, which would be the remedy required for the conditions suggested by Mr. Bernard. The method is expensive in loss of time, but not attended with damage to men or bad effects on the furnace. The more customary practice of maintaining the volume of blast at all hazards does not seem to be justified by either theory or practice, and sometimes results in disaster. Is this not a question of brute force versus tact?"

Causes of the Decline in Silver.

The recent decline in the price of silver appears to be only due in very small part to the result of the elections in the United States, since the speculative interest in the metal dependent upon that result really dropped some time ago. At present there is little or no speculation in the metal, and the current prices seem to be based upon considerations affecting the actual demand. There are several causes which seem likely to affect this unfavorably for a time. Japan is taking very little silver and will not be a heavy buyer for some time to come. The demand from China is light, owing to light exports and also, in some degree, to the fact that the collection of duties on foreign imports in that country is to be made in gold, a measure made necessary by the heavy interest obligations on the Russian and other loans which must be paid in gold. India is poor, owing to crop failures, and for the balance of the year will be an exporter rather than an importer of silver.

On the other hand there will probably be a considerable demand from Russia, as that country has undertaken to coin a large quantity of silver rouble and half-rouble pieces as the first step toward substituting metallic for the present paper currency. Russia produces hardly any silver, and must buy nearly all she needs for this purposes. The quantity will not be sufficient to make up for the loss in the Eastern demand, but will assist the market. France has also undertaken a considerable coinage of silver for Tonkin and her new possession of Madagascar. Upon the whole, we cannot expect any advance over the present price, but at the same time no considerable fall need be anticipated.—[Engineering and Mining Journal.

Has no Contract with the Wire Nail Pool.

The Bates Machine Co., of Joliet, Ill., writes us to correct statements contained in the petition of Lewis C. Bramkamp, of Cincinnati, in his suit against the Wooley Machine Works, of Anderson, Ind., and firms connected with the wire nail pool. The Bates Machine Co. denies the allegation reproduced in these columns from the petition, that it had been subsidized by the pool to the extent of $20,000 a year, or $1,700 a month not to sell wire machines to firms outside the pool. It adds that it has no contract with the nail pool, is not being paid money for the purpose alleged, and has no connection in any way with the association.

The Falls Hollow Staybolt Co., Cuyahoga Falls, O., has a letter from J. B. Barnes, superintendent of motive power of the Wabash Railroad, dated the 4th inst., saying that specifications of standard Wabash engines have been issued recently and that the proposition is to be in the market for a number of these locomotives. It adds that in the specifications

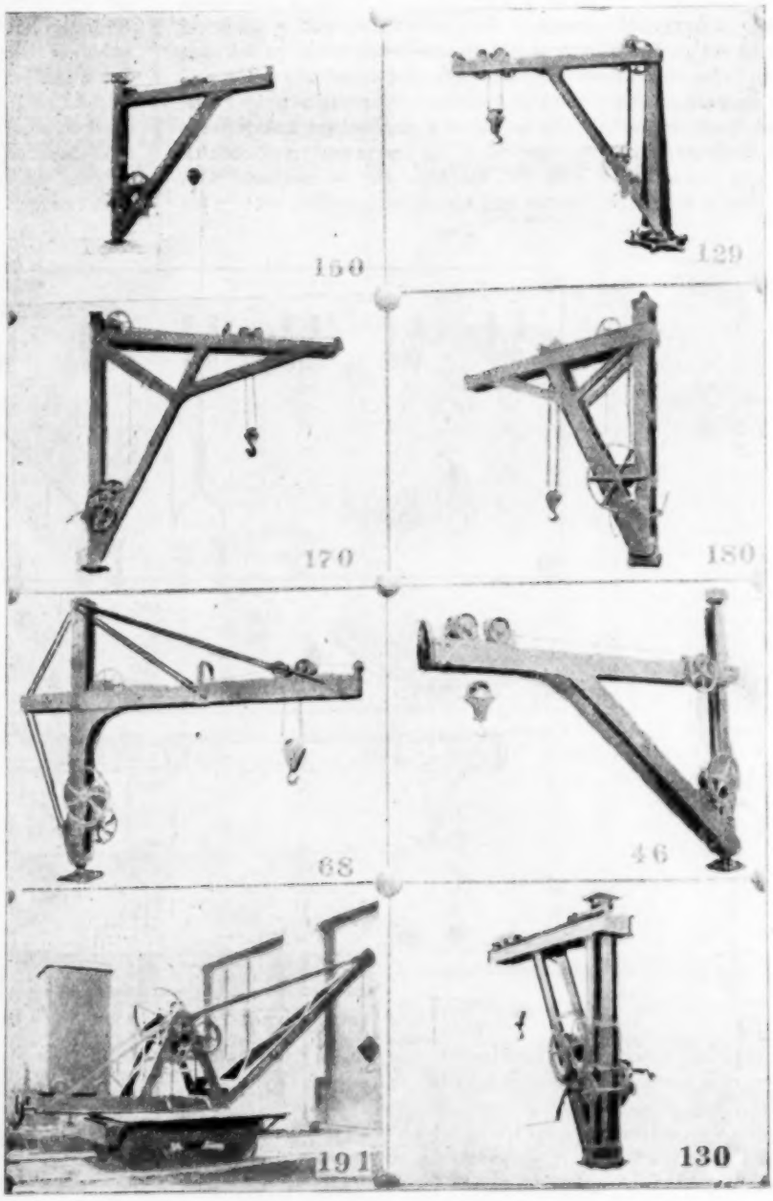


FIG. 5.—WHEEL CASTING AND LIGHT CRANES. PAGES 12 AND 13.

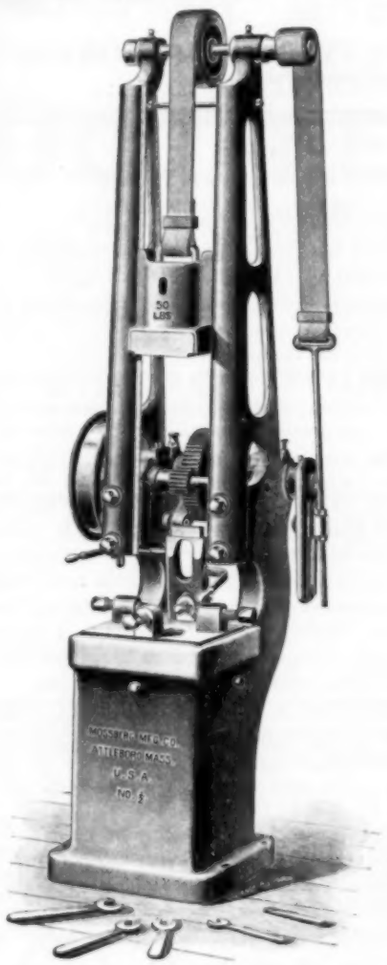
Falls hollow staybolts are called for, "in confidence that they are the best we can buy for the purpose intended." A recent report from the testing department of the Southern Railway Co. shows for a sample of the Falls staybolt an area of .657 square inch; elastic limit per square inch, 31,600; ultimate tensile strenth, 51,000; 31.25 per cent elongation in eight inches, with fibrous fracture.

The Thos. D. West Foundry Co., Sharpsville, Pa., is now running full, something it has not been able to do since December of last year.

Twenty puddling furnaces and all the finishing departments are busy at the Sharon Iron Works, Sharon, Pa.

AUTOMATIC DROP PRESS.

A new automatic drop press, built by the Mossberg & Granville Mfg. Co., Providence, R. I., is shown in the illustration. The style represented is intended as a forging drop, or for use of spoon and fork dies. The drop is also built with poppets, either four or six in number, adapting it to any style of dies. It is self-contained, the driving mechanism being at the base where the operatior can get at it, and is worked by either hand or foot trip. There are seven sizes, with hammer ranging from 50 to 1,000 pounds. The lift of the drop can be instantly changed from 0 to the extreme height of the guides, giving the advantage of a slow blow or a heavy one. A safety catch, or pawl, is attached to the inner side of the right-hand guide (not shown in the cut) which prevents the hammer falling from any cause except the tripping of the treadle, or



the breaking of the belt. The gap in the side arm makes it adapted for work not otherwise possible in a drop press of the same size, and also allows the operator the free use of his hands, increasing the output 25 to 50 per cent.

American vs British Electrical Machinery.

A recent report of the British foreign office referring to machinery trade at Iquique and Northern Chili, says that in the nitrate industry "great quantities of machinery of every sort, locomotives, boilers, tanks, are constantly required both for new works and for maintaining the old ones. Here the British manufacturers hold their own without difficulty. Their efforts to secure trade are worthy of success. They issue catalogues in the Spanish language, and, when possible, prices are affixed. Sterling prices are quite sufficient, the unit in this denomination being commonly used throughout Chili. In one department, however, we are often run out of the market. I refer to electrical machinery and appliances. The United States are able to turn out satisfactory work in this line, well finished, and up to date, and it may be observed *en passant* that the commercial travelers representing the hugely capitalized companies in the States seem to have more push and to be more active than their English confrères."

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Moseley Lathe Co. will operate the machine shop at Elgin, Ill., formerly owned by Moseley & Co., and will continue to manufacture the Moseley lathe, which is well known in the trade. H. N. Moseley will be superintendent and manager.

Thos. W. Harper and L. Le Grand have opened a machine shop at Wikles-Barre, Pa. They will do new work and repairing.

George Van Nostrand, Georgetown, Tex., will be in the market for second-hand lathe, 22-inch swing, 16, 18 or 20-inch bed; drill press, 16 to 20-inch.

The Marvel City Machine & Foundry Co., Bessemer, Ala., wants prices on foundry and machine shop equipment.

The Chase-White Furnace Co. has filed articles of incorporation at Superior, Wis. The capital stock is $50,000. The company will manufacture hollow blast rocking grates, boilers, engines, etc. The incorporators are Henry L. Chase, James L. White and W. C. Ribenack.

A company to manufacture laminated steel bicycle tubing has been organized at Tipton, Ind., and building has begun. The capital is $50,000. The officers are John P. Kemp, president; J. M. Hunter, vice-president and general manager, and Jas. N. Waugh, secretary and treasurer.

The Lounsbury Mfg. Co. has been incorporated at Chicago, with a capital stock of $25,000, to manufacture electrical machinery, by Herbert H. Hewes, George C. Purdy, David B. Carse, W. B. Greenlee and Clarence Cummings.

A. H. Barber & Co. has been incorporated at Chicago, with capital stock of $150,000, to manufacture ice-making machinery, etc., by Abbot H. Barber, W. S. Goodhue, S. D. Flood and E. L. McAdam.

New Construction:—

Andrew Carnegie has just opened bids for the new public library which he will erect for the town of Homestead. The estimated cost is $250,000. Similar buildings are promised to the towns of Duquesne and Carnegie.

The Salem Iron Co., of Leetonia, O., will erect a casting house, and has given the contract to the Shiffler Bridge Co., Pittsburg. The Shiffler Bridge Co. is now making additions to buildings for the Riverside Iron Works, and A. M. Byers & Co. It has also contracts for two furnaces for the Salt Mfg. Co., Natrona, Pa., a stock house for the Low Moor Iron Co., an 11-stall round house for the Cornwall & Lebanon Ry., a locomotive coaling station for the Philadelphia subway; and two large buildings for the Gas Engine & Power Co., New York.

The Glens Falls Paper Mills Co., of Glens Falls, N. Y., is making extensive improvements in its various plants and has placed the order with the Berlin Iron Bridge Co., of East Berlin, Conn., for a new pulp mill, at Cadyville, N. Y., including water tower and boiler house. The company has also placed an order with the Berlin Iron Bridge Co. for additional buildings for its Kent's Falls plant, consisting of a pulp mill, boiler house, barker room and wood room. The contract is a large one. Orders for machinery for equipping the various buildings will be placed at once.

The International Boiler Works, East Stroudsburg, Pa., is erecting a new shop, which will be fitted with modern machinery for building boilers. Among the machines are a steam riveter and a 20-foot pair of bending rolls for making large boilers in two sheets. The dimensions of the shop are 100 x 106 feet, and it is expected to be in full operation by April 1.

It is reported from Wheeling that a syndicate headed by Senator Camden will erect a pulp and wood working plant at Gauley, W. Va., which will cost $1,000,000.

The Eagle Brass Works, Chattanooga, Tenn., will rebuild its foundry, which has been damaged $4,500 by fire.

The Karthaus Fire Brick and Clay Co., of Lock Haven, Pa., has been organized with a capital of $10,000. The officers are: President, W. T. Gilliland; vice-president, F. L. Con-

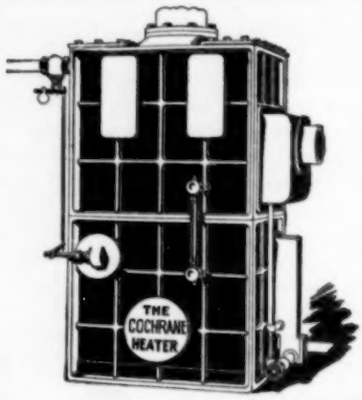
OPEN HEATERS FOR BLAST FURNACES.

"We do not believe in them for plants of this kind," was the remark made to us recently by a prominent engineer whose specialty is the design and construction of blast furnaces.

"Why not?" said we. In reply, he stated that such plants were run continuously night and day, without any stops for examination and repairs, and that therefore closed or pressure Heaters were preferred for this particular service.

Was it not curious that at that precise moment we were shipping two of our large COCHRANE HEATERS to replace some six Heaters of the pressure type, that had given out after a few years' use? These closed heaters had rusted out after continually leaking, and the owners—blast furnace people—thought it advisable to get something better adapted for their purposes.

Hot water—real purification—reliability—ease of operation and cleaning—simplicity and adaptability for the purpose of the material used, insuring freedom from repairs and longevity—these are the advantages which are doubling every year our sales of the COCHRANE HEATERS.



HARRISON SAFETY BOILER WORKS,
PHILADELPHIA, PA.

dreit; secretary, J. A. Heckendorn; treasurer, J. S. Brier; general manager, L. M. Impson. A plant will be built at once.

The General Electric Co. is building an addition to its plant at Schenectady, N. Y., and has given the contract for the steel structural work to the Pittsburg Bridge Co. The building will be 100 x 236. The contract for the new Monongahela Connecting Bridge has also been given the Pittsburgh Bridge Co. and work upon it will be begun at once.

Plans have been drawn for a new bridge across the Ohio River at Marietta. Pittsburgh capital is said to be interested, among others Wm. Jutte, the Pittsburgh coal operator.

The Camden Clay Co. has been incorporated and will at once erect a plant at Spillman, W. Va., for the manufacture of brick, tile and sewer pipe. The plant will cost $300,000.

Fires and Accidents:—

The Sycamore Foundry & Machine Co.'s plant, Sycamore, Ill., was damaged by fire on Nov. 8. Valuable patterns were destroyed.

The large plant of the Boston Bridge Co., at Cambridgeport, Mass., was destroyed by fire on Nov. 7. Loss on buildings and machinery, $160,000; insurance, $125,000. The works will be rebuilt immediately.

Additions, Enlargements, Removals, Etc.:—

The statement that the Brush electric works in Cleveland, are being removed to Lynn, Mass. is true to this extent: The arc light business is being concentrated at Lynn, following the plan of the company to make each plant the special manufacturing point of some one line. Arc lamps and arc light dynamos have been made both in Cleveland and in Lynn. Hereafter Lynn will have all this business. Other departments of the Cleveland works will be continued, however, as heretofore.

The East Birmingham (Ala.) Foundry & Machine Co. is preparing to increase its capacity in all departments, and will make important additions to its plant, particularly in the Corliss engine department. A specialty will be made of building Corliss engines.

It is stated that the Newport News Ship Building & Dry Dock Co., Newport News, Va., will enlarge several of its shops in the near future.

The East Lebanon Iron Co., Lebanon, Pa., will erect a new mill, dimensions to be 160 x 60 feet, and will place an engine, 18 inch train, shears, etc. This will be the largest train in the vicinity of Lebanon.

General Industrial Notes:—

The J. H. McEwen Mfg. Co., of Ridgeway, Pa., which makes a specialty of engines for electric lighting, in addition to other electrical specialties, made an assignment Nov. 12. The assignee expects to complete unfinished work under order of the court.

The Union Railway Co., Pittsburg, owned and controlled by the Carnegie Steel Co., Ltd., on last Saturday purchased 50 acres of land adjoining the borough of Duquesne, on the west and south of the Pittsburg, Virginia & Charleston Ry. A similar purchase in the same locality was made some months ago. The Carnegie Steel Co. now controls nearly all the frontage on the Monongahela river, between Homestead and Duquesne.

The Clonbrock Steam Boiler Co., Brooklyn, N. Y., is extremely busy and has much work ahead. Business prospects are reported by the company to be very bright.

The Pittsburg Wire Works, at Braddock, resumed last week.

The new blooming mill of Jones & Laughlins, Ltd., Pittsburg, which was completed some time ago, was started early in the month.

A contract for 25 air compressors and 25 air receivers, of medium and small sizes, has been closed by the Clayton Air Compressor Works, Havemeyer Bldg., New York, with one company, delivery of the entire order to be made within six months from date. The Clayton works also report sales of five air compressors of standard pattern during the first week in November, and the indications point to a decided revival of trade in air compressors, many orders having been held in abeyance pending the result of the election.

The Burden Iron Co., Troy, N. Y., put 24 additional puddling furnaces in operation last week.

The building of an open-hearth plant by the Brown-Bonnell Iron Co., Youngstown, O., is contingent upon the erection of two bridges by the city. The matter has been under consideration for two years, but is in no tangible shape yet.

The new tin plate plant at South Connellsville, Pa., is expected to start up this week, the tests of the machinery and needed adjustments having been made. The lock works of the Slaymaker-Barry Co., at the same place, are nearly ready for occupancy.

Isabella Furnace Co.'s No. 2 stack, Pittsburg, is being relined and the three stoves are being rebuilt after the Kennedy construction.

An order for 10,000 tons of rails has been placed by the Santa Fe with the Colorado Fuel & Iron Co.

Benjamin Talbot, of Pencoyd, Pa., has sold his basic lining patent to the Bessemer Steel Association. The steel association has been engaged for some time in the effort to establish control of basic open-hearth steel manufacture.

With the completion of a new independent high-speed mill, the Washington-Elliott Steel Co., of New Castle, Pa., will have a considerably enlarged capacity and the working force will be increased.

The Eagle mill at Ironton, O., has started up with orders that will occupy it for several weeks.

Edgar Thomson Steel Works started Nov. 15 and will be operated double turn until the holiday shut-down.

The Studebaker Mfg. Co., of South Bend, Ind., has filed with the Secretary of State a statement that it had increased its capital stock from $1,000,000 to $3,000,000.

John N. Bass has closed very heavy car wheel orders for his works at Chicago, and at Ft. Wayne, Ind., since the election.

Locomotive and car business reported by the *Railroad Gazette:* The Wabash is reported in the market for 30 new

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick

GOVERNMENT ⁂ STANDARD.

Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

Home Office and Works:—MOUNT SAVAGE, Alleganv County, Md

Branch Offices:—No. 1 Broadway, New York, N. Y.; No. 222 So. Third St., Philadelphia, Pa.; Ferguson Block, Pittsburgh, Pa., Stowe, Fuller & Co., 195 Merwin St., Cleveland, Ohio.

DUCTILE CAST IRON

TENSILE STRENGTH, 60,000 TO 80,000 LBS.

Homogeneous, Clean and Solid. Suitable for Car Couplers and Knuckles; Crank Shaft and Gearing.

MADE FROM 10 TO 10,000 Lbs. IN WEIGHT. ESPECIALLY ADAPTED FOR

Electrical Work because of its Superior Conductivity.

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Steel Plants, Sheet and Tin Plants, Gas Furnaces and Producers, Structural Iron and Steel.

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The largest shippers of FIRE BRICK in the West

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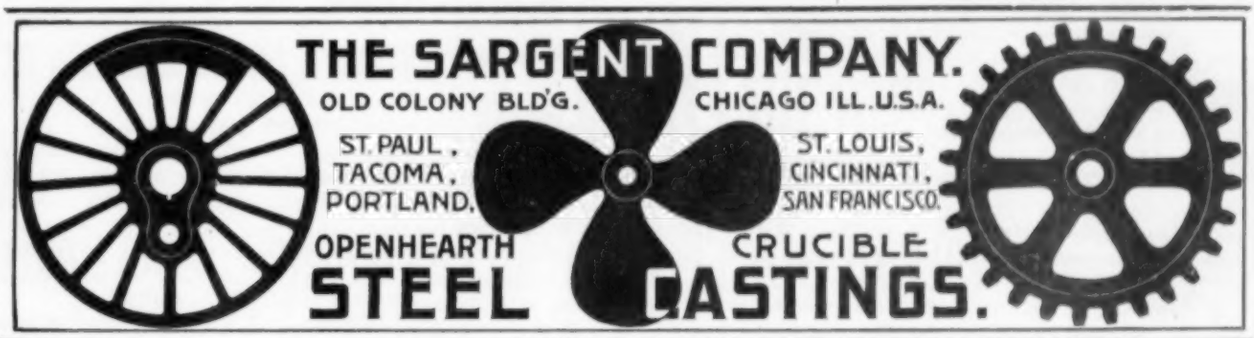

locomotives. The Seaboard Air Line is reported to have given an order for 12 locomotives to the Richmond Locomotive & Machine Co. The Baldwin Locomotive Works, Philadelphia, have delivered four new locomotives to the Canada Atlantic. It is reported that the Norfolk & Western will increase its car equipment. The Mt. Vernon Car Mfg. Co. has started up its shops on the Louisville & Nashville order for 300 coal cars. The Ensign Mfg. Co., of Huntington, W. Va., received an order from the Chesapeake & Ohio for 200 coal cars of 30 tons capacity.

The Eagle Furnace, at Spring Valley, Wis., will be sold at auction in Ellsworth, Pierce Co., Wis., on Dec. 10. The furnace is 65x13 feet, designed for charcoal fuel. The property consists of 74 acres, on which are tenement houses and office buildings. Raw materials may be had at convenient distances. The iron from this furnace has been successfully used for car wheel and malleable purposes. D. B. Dewey, 111 Monroe st., Chicago, is receiver and master commissioner.

The Alabama Iron & Steel Co. has been placed in the hands of a receiver, A. J. Perry, of Birmingham. The property consists of a charcoal iron furnace and nail mill at Brierfield and a large tract of ore land in that neighborhood, together with a considerable quantity of manufactured iron now on hand. The receivership was made necessary by the recent death of Major T. J. Peter, former manager and part owner of the property.

The strike at the Tudor Iron Works, East St. Louis, which has been in force over two years, has been declared off by the Amalgamated Association.

After making repairs to the converting mill the Edgar Thomson Steel Works resumed operation in full Monday morning.

The Buffalo Forge Co., Buffalo, N. Y., recently received an order for an apparatus to be used for what is probably the largest glue dryer in the world. It involves the use of three steel plate fans, 170″ tall, having inlets 79″ in diameter, outlets 63½x70″ wide. The wheels inside the fan casings are 120″ diameter by 66½″ wide at periphery. Each one of these fans is driven by a 12x14 horizontal self-contained center-crank engine of the Buffalo Forge Co.'s make. Each fan will deliver at its outlet 150,000 cu. ft. of air per minute at 1 oz. pressure, and each is to be supplied with a heater of appropriate size. When it is stated that the combined capacity of these fans is 450,000 cu. ft. of air per minute, it may be

U. BAIRD MACHINERY CO.

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Have a Special Lot of Second-Hand Tools. All in First-Class Condition.

1—55″ Allen Riveter.
1—24x24x7 ft. New Haven Planer.
1—30x30x8 ft. Harrington Planer.
1—36x36x18 ft. Sellers Planer.
1—36x36x20 ft. N. Y. Steam Engine Co. Planer.
1—16x18″ Lathe & Morse Crank Planer.
2—15″ Hendey Shapers.
1—15″ Youngson Shaper.
1—15″ Smith and Mills Shaper.
1—10″x5′ Prentice Engine Lathe.
1 each 14″ and 15″x6′ Ames Engine Lathe.
1—16x5 ft. Bullard Engine Lathe.
1—18x8 ft. L. W. Pond Engine Lathe.
1—24x8 ft. Phillips Engine Lathe.
1—24x14 ft. Lathe & Morse Engine Lathe.
1—38x14 ft. New Haven Engine Lathe.

AND MANY OTHERS.

We have all the best makes of New Tools. Send for Second-Hand List.

ATWOOD & M'CAFFREY,

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MANUFACTURERS OF AND DEALERS IN

All Kinds of Pipe, Globe and Gate Valves, Fittings and Appliances for Steam, Gas, Water and Hydraulic Work.

Phosphor Bronze ("Elephant Brand") Castings, Coolers, Tuyeres and Cinder Notches for Blast Furnaces supplied promptly.

Rolling Mills, Steel Works, Blast Furnaces Coal and Coke Works, Power Houses for Electric Street Railways, etc., promptly fitted up by Experienced Workmen.

AIKEN Duplex and CRITCHLOW Valves, either three or four way, for operating Mill and Hydraulic Machinery of all kinds under any desired pressure, and Stop Valves for same.

Agents for the CAMERON STEAM PUMP, which is made in every possible variety, and suitable for all purposes to which Steam Pumps can be applied.

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seen that the glue dryer is unprecedentedly large. The outfit will be installed in the works of Delaney & Co., Philadelphia, under the specifications of Francis Bros. & Jellett, engineers of Philadelphia.

The Consolidated Steel & Wire Co. again started its Braddock, Pa., plant Nov. 16. The new heating furnaces, which proved unsatisfactory have been entirely rebuilt, and in a recent test showed a capacity of 550 tons per day, an increase over the former furnaces of 150 tons. A new plunger has been added which does away with the services of ten furnacemen. A billet is pushed into the furnace and the same action pushes another out and onto a train carrying it to the rolls. The galvanizing department hereafter will start Sunday night instead of Monday morning, thus making eleven turns weekly instead of ten.

The Garland Chain Works, at Braddock, has started in full after a short period of idleness.

The Monongahela Tin Plate Works have started three of their eight furnaces. When repairs are completed the others will be fired.

At Benwood, W. Va., Riverside Furnace made its first cast Nov. 15. Belmont Furnace, of the Wheeling Steel & Iron Co., will be blown in next week on the completion of repairs.

The Canton Rolling Mill Co., Canton, O., announces that it will be in position to manufacture galvanized sheet steel by Jan. 1.

The Pennsylvania Steel Co. is placing a new engine of greater capacity in its rail mill.

The sheet mill at Hammond, Ill., until recently operated by the Illinois Steel Co., will resume operations in January. Corning Brothers, of Peoria, will operate it if the Illinois Steel Co. does not renew its lease.

The Maumee Rolling Mill Co., Toledo, O., has increased its force. The sheet mills have been closed for several months.

The H. M. Myers Co., of Beaver Falls, resumed operations last week.

At Steubenville, O., the Means foundry and machine shop is running full time. Robinson & Irwin's machine shop has put its entire force on full time. The Sharp foundry is running full on orders.

The new plant of the Chess Bros., at Rankin, Pa., started on Monday of this week, employing 150 men.

The Lackawanna Iron & Steel Co. will hurry the completion of the lining and repairs to its furnaces at Colebrook. No. 1 furnace will be started as soon as possible. In all, three idle furnaces in the Lower Susquehanna district are now being repaired preparatory to resuming.

The bridge and engineering works of Fair, Williams & Co., at Ottumwa, Ia., are kept busy. Orders are being received for bridge work from several points in the State.

The new foundry and machine works at Spartansburg, N. C., will be in full operation by Jan. 1. The Christopher rotary engine will be manufactured.

The Big Four, Chesapeake & Ohio, Baltimore & Ohio, Baltimore & Ohio Southwestern, Erie and Pennsylvania railroads have increased the working forces at their shops.

The Laughlin tin plate works at Martin's Ferry, O., are running five hot mills steadily.

At the works of the American Wire Co., Cleveland, the force has been increased about one-third.

T. T. Hillman, of Birmingham, Ala., has leased the Gadsden furnace, which has been idle for four years; he will reline and overhaul it and put it in operation at once.

A large flanging plant is to be added at once to the equipment of the Paxton Rolling Mills, at Harrisburg.

A Cincinnati dispatch says that on Nov. 16, 40 men resumed work at the hydraulic power mill of the Addyston Pipe & Steel Works, in Newport, Ky., shut down for eight months; and that the American Bolt & Nut Works, at Newport, also resumed.

The bar mill of the Riverside Iron Works, Wheeling, W. Va., went on full time Nov. 16.

The Rosena furnace, at New Castle, Pa., was lighted last Saturday.

The Elliott-Washington Co., of New Castle, has just completed additions to their plant. They are well booked for orders and expect soon to increase their force.

With the resumption of three or four mills this week the entire plant of the Homestead Steel Works is again running—the first time in four months.

It is reported that the National Tube Works Co. has purchased $200,000 worth of property adjacent to its plant, at McKeesport.

It is announced that the old Beaver Falls Trunk Co.'s plant has been leased by a new company and will be equipped for the manufacture of chains.

At Marshalltown, Ia., the hardware dealers of the State perfected their plan for an independent wire nail plant, growing

out of their opposition to the pool. The plant will be established at Marshalltown.

The Juniata Furnace, at Newport, Perry Co., will be put into blast after repairs and relining.

The William Powell Co., of Cincinnati, has started its plant full time after five months of operation on short time.

The American Engine Co., Bound Brook, N. J., has begun the shipment of its new American-Ball engines. Since the addition of this line of work, the business of the company has increased and the works are now running double time.

The new plant of the McCool Tube Works, at Beaver Falls, Pa., is rapidly nearing completion and is being equipped with the most modern machinery available.

Repairs are being made on the Sharon Iron Co.'s furnace, at Sharon, Pa., preliminary to going in blast.

The Babcock & Wilcox Co., Pittsburgh, has furnished two boilers for the new plant of the New Castle, Pa., Electric Railway Co. The Buckeye Engine Co., Salem, O., has just shipped two cross compound engines of 500 horse-power each to the same plant, and the Hall Steam Pump Co., of Pittsburgh, has furnished two large condensers.

Rebecca Furnace of the Kittanning Iron & Steel Mfg. Co., Kittanning, Pa., is being overhauled, and will probably resume blast by Jan. 1. The stack has been idle since July.

The Westinghouse Electric Co., Pittsburgh, is building an electric engine of 1,200 h.p. for the Paris Exposition of 1900.

The Westinghouse Machine Co., Pittsburgh, Pa., is having considerable trade in engines for shipment to South America. During the last three or four months the concern shipped the following compound engines abroad: To Algeria one 80 h.p.; to Belgium one 330 h. p., two 100 h. p.; to France one 1,200 h. p. In addition to this they have shipped a large number of Standard and Junior engines during the same period to various parts of the Old World.

Several departments of the Delaware Iron Works, Wilmington, Del., which have been idle for several weeks, have resumed operations.

A triple effect evaporating apparatus has just been built by the Walburn-Swenson Co., 944 Monadnock, Chicago, for the New York Tartar Co., of Brooklyn, N. Y., for the purpose of evaporating tartar liquors, which are acid and attack iron rapidly. For this reason the entire apparatus, including all vapor pipes, had to be made of bronze of a certain composition that had been found by experiments to resist the action of this acid. It was cast entirely of electrolytic copper and pure tin and weighs fully 100,000 pounds. The Walburn-Swenson Co. made these castings under a guaranty not to vary more than one per cent from the agreed composition of this alloy, and a large number of analyses of borings have shown every casting to be well within the limit. For such large castings as this apparatus is composed of, this certainly shows extremely careful foundry work. The evaporation is done entirely by exhaust steam in this apparatus, and is one of the widely known multiple effects, over one hundred of which have been erected by this company within the last few years, some of which have a guaranteed capacity to evaporate a ton of water per minute by exhaust steam. Although this apparatus was first designed for the evaporation of sugar solutions, it has been adapted to serve the purpose of all kinds of evaporation where economy of fuel is an object. The plant of the Walburn-Swenson Co. is located at Chicago Heights, Ill.

The Chisholm, Boyd & White Co., Chicago, has lately perfected the White patent mineral press, for making into bricks furnace flue ore dust, and has placed one of them with a large iron company for use at its blast furnaces. The press is reported to be giving the best satisfaction. Other presses are in process of construction, and will be sent to furnaces in the near future. A description of the machine will be given in a later issue.

J. W. Duntley of the Chicago Pneumatic Tool Co., Chicago, has just returned from a very successful three months' business trip to Europe. He started offices for the company in London, Paris, Berlin, and Vienna, and reports a very good foreign business already closed. Mr. Duntley found a very large trade for American air tools and compressors in all the countries he visited.

Steam Yachts and Marine Machinery.

Also Towing Launches built by Marine Iron Works, Clybourn and Southport avenues, Chicago. Free illustrated catalogue. Write them for it.—*Adv.*

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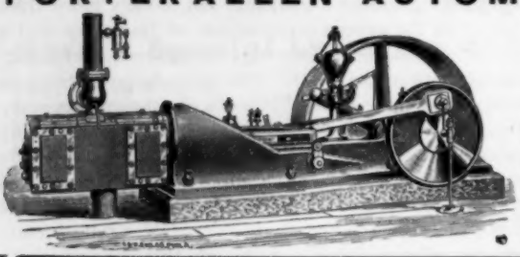

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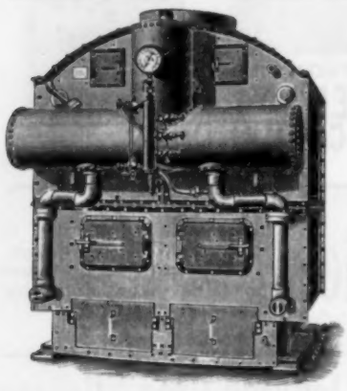

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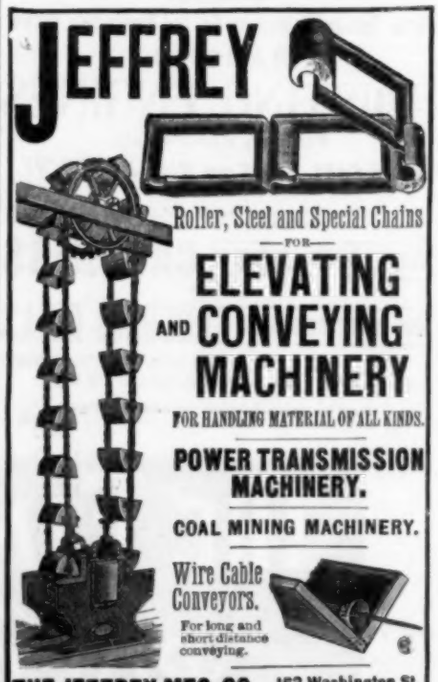

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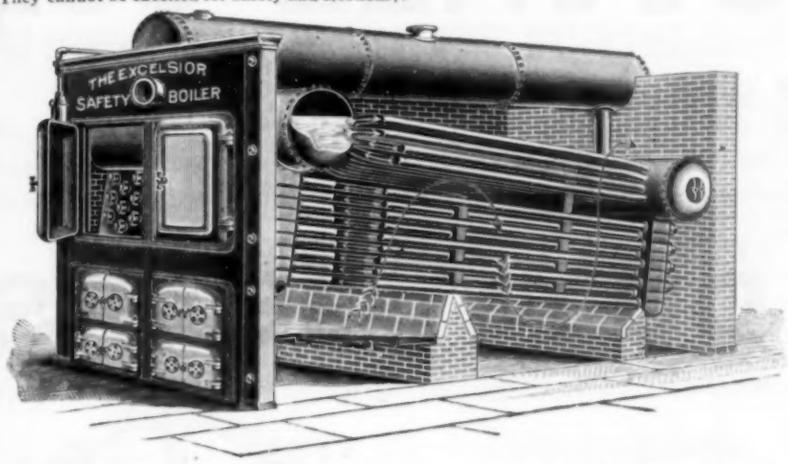

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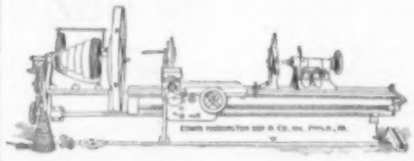

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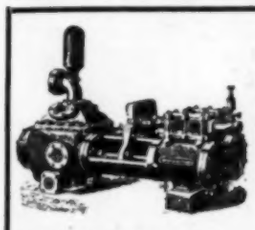

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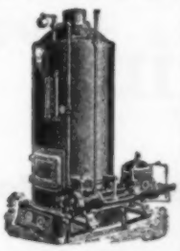

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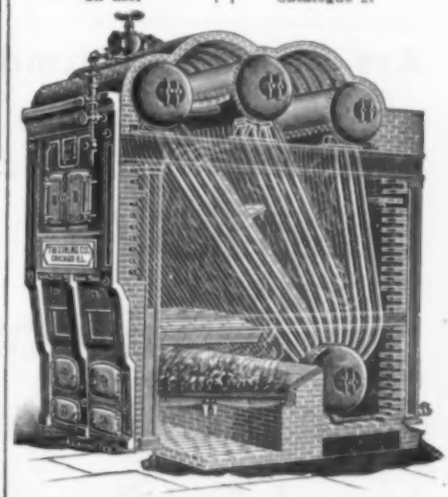

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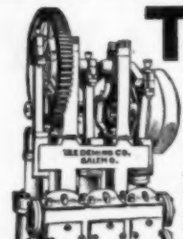

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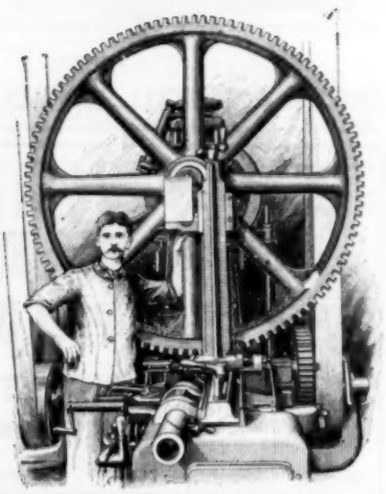

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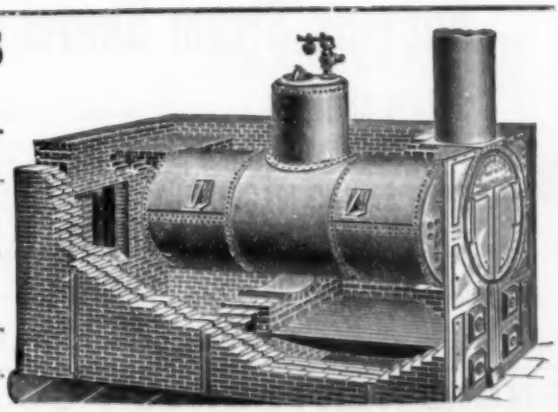

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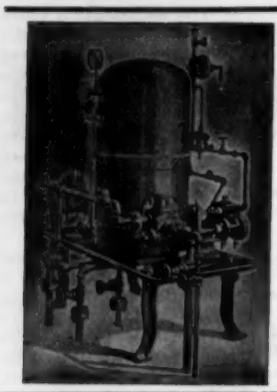

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Pittsburgh, Bellaire and East	† 3:15 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	* 5:00 pm	* 8:30 am
Philadelphia and New York	*11:10 pm	* 4:30 am
Baltimore and Washington	*11:10 pm	* 4:30 am
Alliance and Pittsburgh	*11:10 pm	* 4:30 am

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Xenia and Cincinnati	* 8:10 am	* 5:45 pm
Akron and Columbus	* 8:10 am	* 5:45 pm
Akron and Columbus	† 1:40 pm	†12:10 pm
Columbus and Cincinnati	* 8:00 pm	* 7:30 am

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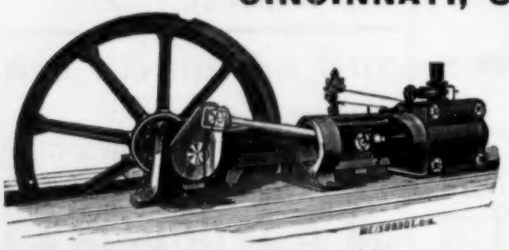

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Simple and Compound.
Shafting, Hangers, Pulleys.
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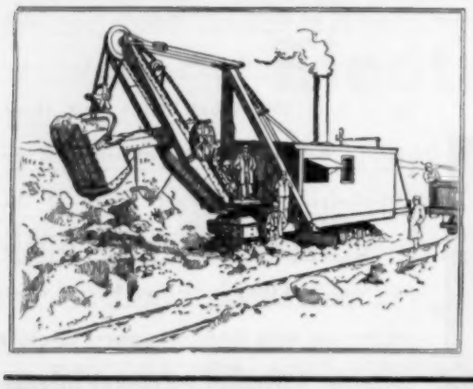

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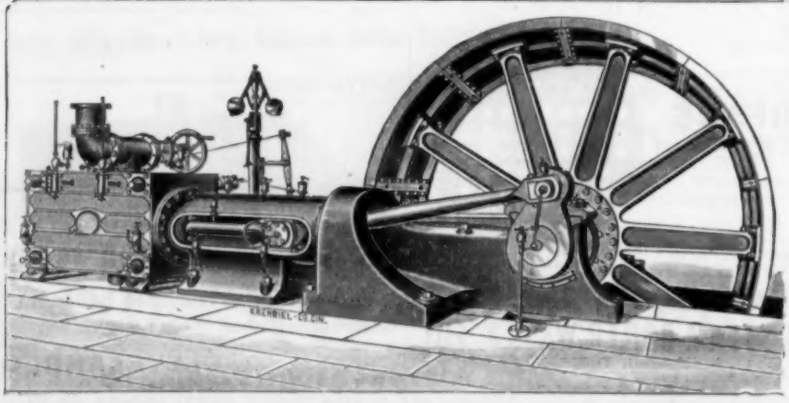

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Engines for Rolling Mills, Electric Railways and Electric Light.

Engines of all Sizes and for all purposes.

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Be progressive—keep in touch with the times.

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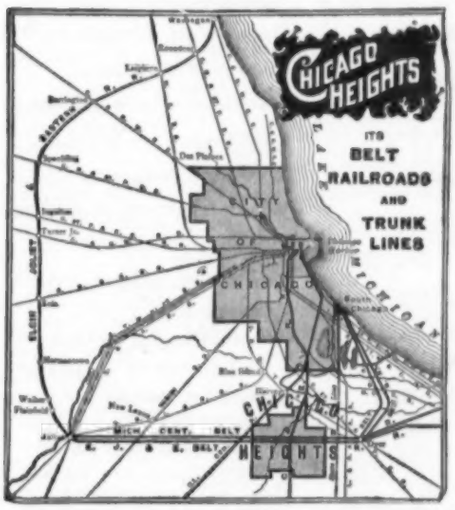

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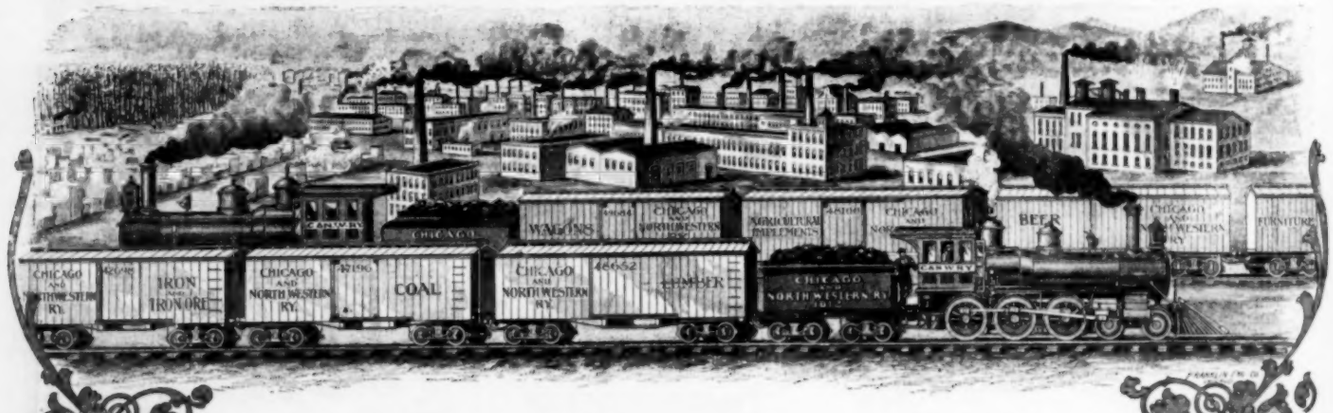

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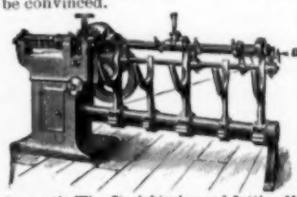

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Edward Brown, Philadelphia, Pa.

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Rand Drill Co., Chicago, Ill.

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Rolling Mill Supplies—
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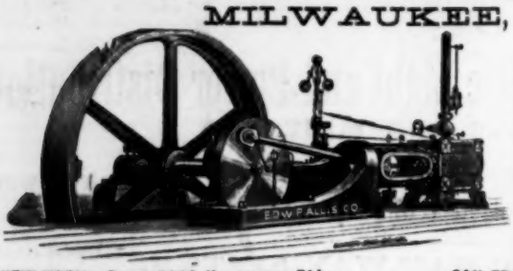

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No. 1 American Scotch	13 25
No. 2 American Scotch	11 75
Lake Superior Charcoal	13 50

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White and Mottled	10 00
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Bessemer	12 40@12 50

CHICAGO:

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Local Coke Foundry No. 1	11 75@12 25
Local Coke Foundry No. 2	11 25@11 75
Local Coke Foundry No. 3	11 00@11 25
Local Scotch Foundry No. 1	11 75@12 25
Local Scotch Foundry No. 2	11 25@11 75
Local Scotch Foundry No. 3	11 00@11 25
Southern Coke No. 1	11 90@12 40
Southern Coke No. 2	11 40@11 90
Southern Coke No. 3	10 90@11 40
Southern No. 1 Soft	11 40@11 90
Southern No. 2 Soft	11 15@11 40
Southern Silveries No. 1	11 15@11 65
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Jackson Co. Silveries	14 00@16 05
Ohio Silveries No. 1	15 00@15 55
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Alabama Car Wheel	16 25@16 75
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Southern Coke No. 1, Foundry	$10 75@11 00
Southern Coke No. 2 and No. 1 Soft	10 25@10 50
Hanging Rock Coke, No 1	12 50@13 50
Hanging Rock Charcoal No. 1, Fdy	15 00@16 00
Tennessee Charcoal No 1	13 00@14 00
Jackson County Silvery No 1	13 50@14 00
Southern Coke, Gray Forge	9 25
" " Mottled	9 25
Standard Alabama Car Wheel	14 75@15 50
Tennessee " "	13 50@14 50
Lake Superior " "	14 75@15 25

BUFFALO:

No. 1 Foundry Strong Coke Iron Lake Superior Ore	$ 12 25
No. 2 Foundry Strong Coke Iron Lake Superior Ore	11 75
Ohio Strong Softener No. 1	12 25
Jackson Co. Silvery No. 1	15 25
Lake Superior Charcoal	13 50@14 50
Southern Soft No. 1	11 40
Hanging Rock Charcoal	17 00

ST. LOUIS (reported by Rogers, Brown & Meacham):

Southern Coke No 1	$10 75@11 00
Southern Coke No. 2	10 25@10 50
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Southern Gray Forge	9 50@9 75
Southern Charcoal No. 1	15 00
Missouri Charcoal No. 1	14 00@14 00
Ohio Softeners	15 00
Lake Superior Car Wheel	15 00
Southern Car Wheel	14 50

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	Gross Tons
Old iron rails	$15 00
Old steel rails	12 00
Old car wheels	12 50
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No. 1 R. R. wrought scrap	$12 50
Mill scrap	9 00
No. 1 Machine cast scrap	9 00
Iron axles	16 00
Axle turnings	8 00
Wrought turnings (free from cast)	7 50
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Steel boiler plates	9 00
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Hoop and band iron	6 50
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1 to 1⅞	1.20 Base.
2 to 2⅞	.20 extra.
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3⅝ to 4	.80 "
4⅛ to 4½	1.00 "
4⅝ to 5	1.30 "
5⅛ to 6	1.80 "
6⅛ to 6½	2.20 "

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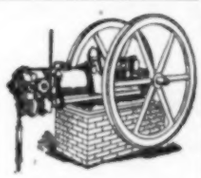

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USED BY NEARLY ALL THE RAILROADS.

6⅝ to 7¼	2.50 extra.
¾ to ⅞	.10 "
⅝ to 11-16	.20 "
½ to 9-16	.30 "
7-16 to 15-32	.40 "
⅜ to 13-32	.50 "
5-16 to 11-32	.70 "
¼ to 9-32	.90 "
7-32	1.40 "
3-16	2.50 "

Flats.—Bar Iron.

1½ to 4 x ⅜ to 1	1.20 Base.
4½ to 6 x ⅜ to 1	.10 extra.
6¼ to 8 x ⅜ to 1	.60 "
8¼ to 10 x ⅜ to 1	.80 "
1⅜ to 4 x 1 1-16 to 1½	.30 "
4¼ to 6 x 1 1-16 to 1⅝	.40 "
6¼ to 8 x 1 1-16 to 1⅝	.60 "
8¼ to 10 x 1 1-16 to 1½	.90 "
2 to 4 x 1⅝ to 2	.50 "
4¼ to 6 x 1⅝ to 2	.60 "
6¼ to 8 x 1⅝ to 2	.80 "
8¼ to 10 x 1⅝ to 2	1.00 "
2 to 4 x 2⅛ to 3	.60 "
4¼ to 6 x 2⅛ to 3	.80 "
6¼ to 8 x 2⅛ to 3	1.00 "
1⅞ to 1⅜ x ⅜ to 1	.10 "
1 to 1 1-16 x ⅜ to ⅞	.30 "
¾ to 15-16 x ⅜ to ¾	.40 "
⅝ to 11-16 x ⅜ to ⅝	.50 "
½ to 9-16 x ⅜ to ½	.90 "

Heavy Band Iron.

7 to 10 x ¼ to 5-16	.70 extra.
6¼ to 6¾ x ¼ to 5-16	.50 "
4¼ to 6 x ¼ to 5-16	.30 "
1½ to 4 x ¼ to 5-16	.80 "
1 to 1⅜ x ¼ to 5-16	.30 "
¾ to 15-16 x ¼ to 5-16	.50 "
⅝ to 11-16 x ¼ to 5-16	.80 "
½ to 9-16 x ¼ to 5-16	1.00 "
⅜ to 7-16 x ¼ to 5-16	1.50 "

Heavy bands, 7-32 in. thick 1-10 c. per lb. higher than ¼ to 5-16 thick. **Bevel Edge Shaft Iron** 1-10 higher than same size of Heavy Bands.

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7 to 8 x No. 9 to 3-16	.90 extra.
7 to 8 x Nos. 10, 11 and 12	1.00 "
6¼ to 6¾ x No. 9 to 3-16	.70 "
6¼ to 6¾ x Nos. 10, 11 and 12	.80 "
4¼ to 6 x No. 9 to 3-16	.50 "
4¼ to 6 x Nos. 10, 11 and 12	.60 "
1¾ to 4 x No. 9 to 3-16	.40 "
1¾ to 4 x Nos. 10, 11 and 12	.50 "
1 to 1 3-16 x No. 9 to 3-16	.50 "
1 to 1 3-16 x Nos. 10, 11 and 12	.60 "
13-16 to ⅞ x No. 9 to 3-16	.60 "
13-16 to ⅞ x Nos. 10, 11 and 12	.70 "
11-16 to ¾ x No. 9 to 3-16	.80 "
11-16 to ¾ x Nos. 10, 11 and 12	.90 "
9-16 to ⅝ x No. 9 to 3-16	1.00 "
9-16 to ⅝ x Nos. 10, 11 and 12	1.10 "
7-16 to ½ x No. 9 to 3-16	1.30 "
7-16 to ½ x Nos. 10, 11 and 12	1.40 "
⅜ x No. 9 to 3-16	1.50 "
⅜ x Nos. 10, 11 and 12	1.60 "

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Same as Light Bands, of same sizes.

Beaded Band Iron, 1¼ in. to 2 in. .70

Sand Band Iron, 1-10 c. above same sizes of Light Bands.

Oval Iron.

⅞ to 1⅛	.40 extra.
¾ to 13-16	.50 "
⅝ to 11-16	.60 "
½ to 9-16	.80 "
⅜ to 7-16	1.10 "
½ to 9-16 x 3-16	1.00 "
⅝ to 11-16 x ⅛	1.20 "

Half Oval and Half Round.

2¼ to 3	.60 extra.
⅞ to 2	.50 "
¾ to 13-16	.70 "
⅝ to 11-16	90 "
½ to 9-16	1.20 "
⅜ to 7-16	2 50 "
5-16	3.50 "
¼	4 50 "

Half Ovals less than ¼ their width in thickness, extra price.

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All sizes .1 c extra.

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1¼ to 6,	" 10, 11, 12 or 5/16"	.05 per	100 lbs.
1 to 1⅜,	" 7, 8, 9 or 3-16"	.10	"
1 to 1⅜,	" 10, 11, 12 or 5/16"	.15	"
13-16 and ⅞,	" 7, 8, 9 or 3-16"	.20	"
13-16 and ⅞,	" 10, 11, 12 or 5/16"	.25	"
11-16 and ¾,	" 7, 8, 9 or 3-16"	.30	"
11-16 and ¾,	" 10 11, 12 or 5/16"	.35	"
9-16 and ⅝,	" 7, 8, 9 or 3-16"	.40	"
9-16 and ⅝,	" 10 11, 12 or 5/16"	.45	"
½,	Nos. 7, 8, 9 or 3-16"	.55	"
½,	" 10, 11, 12 or 5/16"	.60	"
7-16	" 7, 8, 9 or 3-16"	.75	"
7-19	" 10, 11, 12 or 5/16"	.85	"
⅜,	" 7, 8, 9 or 3-16"	.95	"
⅜,	" 10, 11, 12 or 5/16"	1.05	"

Iron and Steel Hoops.

Width in Inches.	English Standard Gauge.		
1 7-16 to 3	Nos. 13, 14, 15 and 16	1.60 Base. Extras.	
1 7-16 to 2,	" 17, 18, and 19	.05 per	100 lbs.
1 7-16 to 2,	" 20	.10	"
1 7-16 to 2,	" 21	.15	"
1 7-16 to 1¾,	" 22	.25	"
1 ⅛ to 1⅜,	" 13, 14 and 15	.05	"
1¼ to 1⅜,	" 16, 17, and 18	.10	"

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Elevating and Conveying Machinery

For Handling all kinds of materials.

Special Wrought and Steel Chains of every description; Coil and Cable Chains; Chain Haulages for Coal Mines; Sprocket Wheels; Complete Coal and Ashes Handling Plants; Wire Rope Haulages and Wire Rope.

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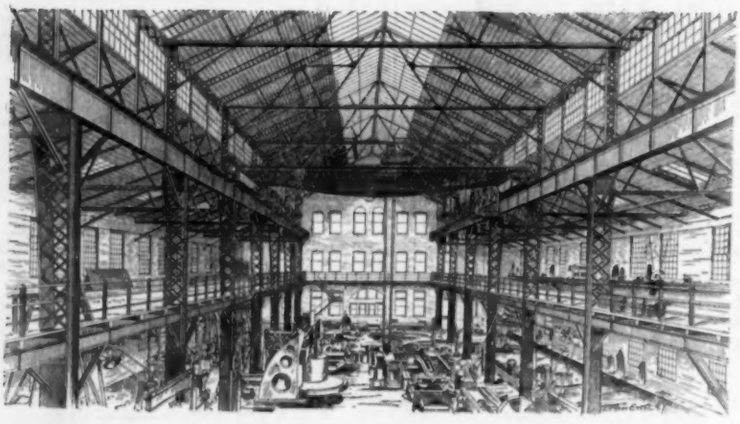

The above illustration (taken direct from a photograph) shows the interior of a Machine Shop built by us for the Lake Erie Engineering Co., at Buffalo, N. Y. The building is 106 feet in width, the center span is 50 feet in width with a wing on each side 28 feet in width. A power crane controls the floor the entire length of the central portion. The roof is covered with slate on iron purlins. The side walls are of brick. The interior is lighted by skylights in the roof.

OFFICE AND WORKS:

EAST BERLIN, : : : : : : : : CONN.

1⅛ to 1¾,	"	19 and 20	.15 per 100 lbs.
1⅛ to 1¾,	"	21	.20 "
1⅛ to 1¾,	"	22	.30 "
15-16 and 1,	"	13, 14 and 15	.10 "
15-16 and 1,	"	16, 17 and 18	.15 "
15-16 and 1,	"	19 and 20	.20 "
15-16 and 1,	"	21	.25 "
15-16 and 1,	"	22	.35 "
⅞,	Nos.	13, 14 and 15	.20 "
⅞,	"	16, 17 and 18	.25 "
⅞,	"	19 and 20	.30 "
⅞,	"	21	.35 "
⅞,	"	22	.45 "
¾ and 13-16	Nos.	13, 14 and 15	.30 "
¾ and 13-16	"	16, 17 and 18	.35 "
¾ and 13-16	"	19 and 20	.40 "
¾ and 13-16	"	21	.45 "
¾ and 13-16	"	22	.50 "
¾ and 13-16	"	23	.60 "
11-16,	Nos.	13, 14 and 15	.35 "
11-16,	"	16, 17 and 18	.40 "
11-16,	"	19 and 20	.50 "
11-16,	"	21	.60 "
11-16,	"	22	.70 "
11-16,	"	23	.80 "
⅝,	Nos.	13, 14 and 15	.40 "
⅝,	"	16, 17 and 18	.45 "
⅝,	"	19 and 20	.55 "
⅝,	"	21	.65 "
⅝,	"	22	.75 "
⅝,	"	23	.85 "
9-16,	"	13, 14 and 15	.45 "
9-16,	"	16, 17 and 18	.50 "
9-16,	"	19 and 20	.60 "
9-16,	"	21	.70 "
9-16,	"	22	.80 "
9-16,	"	23	.90 "
½,	"	13, 14 and 15	.55 "
½,	"	16, 17 and 18	.60 "
½,	"	19 and 20	.70 "
½,	"	21	.80 "
½,	"	22	.90 "
½,	"	23	1.00 "
7-16,	"	13, 14 and 15	.80 "
7-16,	"	16, 17 and 18	.90 "
7-16,	"	19 and 20	1.00 "
⅜,	"	13, 14 and 15	1.00 "
⅜,	"	16, 17 and 18	1.10 "
⅜,	"	19 and 20	1.20 "

Sheet Iron.

No. 10	1 65
No. 12	1 85
No. 14	1 75
No. 15-17	1 90
No. 18	2 00
No. 20	2 15
No. 22-24	2 25
No. 25-26	2 35
No. 27	2 45

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 45
Shell	1 55
Flange	1 65
Marine Flange	1 80
Fire Box	2 25

Above includes plates 90 inches wide.

90 to 96 in. wide	⅛c. lb. extra
96 to 100 in. wide	1c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special.

American Cast Tool Steel.

ROUND, SQUARE, AND OCTAGON.	cts lbs.
1 to 2 in. inclusive	08
9-16 to ⅞ in. "	08
7-16 to ⅞ and 2⅛ to 3 in	09
3⅛ to 4 in	09½
⅝ to 11-16 and 4½	10
1⅛ to 6 in	10½
¼ to 9-32 and 6⅛ to 7 in	11
1 in	13

Flats.	cts. lbs.
2 to 9-16 in. wide by 2 to ⅝ thick	08

Bessemer and O. H. Steel.

Bessemer Machinery	base price,	1 40
Open-hearth Tire	"	1 45
Open-hearth Spring	"	1 80
Sleigh Shoe	"	1 45
Toe Calk	"	1 90
Cutter Shoes, tapered and bent	"	1 60

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 00
Bridge ½, ⅝, 11-16 and ¾ inch diam.	2 55

Wrought Pipe and Boiler Tubes.

Lap weld black, base,		four 10s	62
Butt " " "		four 10s	62½
Lap " galv. "		four 10s	52½
Butt " " "		four 10s	50
Boiler tubes 2¼" and smaller			70
Boiler tubes 2½" and larger			75
Casting screw and socket joint			dis. 52½
Casing inserted joint			dis. 47½

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American	₩ lb 9@10
Wright's	₩ lb 12

Bellows.

Blacksmiths' { Hill's	dis 40
Blacksmiths' { Bullock's	dis 50&10
Moulders'	dis 40@40&10
Hand	dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 7½ & 10
" " " extra	dis 60&10
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 50
Shultz Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 50
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 33⅓
Horton's Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 45
Sweetland "	dis 40
Almond Drill	dis 40
Morse "	dis 20
Skinner's Combination Lathe	dis 40&15
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 30

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 10 to 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	₩ 3½
Iron, steel points	₩ lb 3

Drill and Drill Sockets.

Twist Drills	
Morse Taper & Straight Shank to 1½"	dis 50 & 10 to 60
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 60@60&5
Cleveland " "	dis 60@60&5

Emery.

	No. 4 to No. 54 46 gr.	150 gr.	Flour F. F	C. F.
Kegs, ₩ lb	4½c	5 c	2¾c	
½ kegs ₩ lb	4¾c	5¼c	2¾c	
¼ kegs ₩ lb	5 c	5½c	3 c	
10 lb cans, 10 in case	6 c	6½c	5 c	
10 lb cans less than 10	10 c	10 c	7½c	

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Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

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Detroit	dis 60@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 60@70
Celluloid	dis 10&33⅓
Northampton	dis 50
Crystal	dis 65@70
Vitrified	dis 60@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F.	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 60@70
Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	10c
" " " over 5 lbs	8c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4½	4	3½	3⅛
Hexagon	15⅝	11½	8⅛	6	5½	5⅛	
Washers	9	8	7	5	4½	4⅛	4⅛

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

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Standard Penny Nails, ₩ keg, base.

{ Car lots	$2.55
{ Less than car lots	$2.65

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Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

Pulleys.

Iron Pulleys, Walker List.....dis 50
Medart Pulleys.....dis 50
Split Wood Pulleys.....dis 55@60

Pulley Blocks.

Moore's Anti-Friction Differential Chain Pulley Block.....dis 20

Rivets.

Iron, Thousand, list November 1, 1894.....dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894.....dis 60@65
Copper.....dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list.....dis 10
Machine Screw Taps.....dis 50
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 50
Pulley Taps.....dis 40

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

Wire.

New List, Apr. 9, 1894

Brass.....dis 35
Copper.....dis 35
Bright and annealed, Nos. 0@18.....dis 70&10&5
" " Nos. 19@26.....dis 75@75&5
" " Nos. 27@36.....dis 75&10&5
Coppered Nos. 0 to 18, market list.....dis 70@70&5
Galvanized Nos. 0 to 18 " " .....dis65&
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire regular.....95c ₩ lb dis 30

Wrenches.

Coe's genuine.....dis 4 and 10
Girard Standard.....dis 70&15
Agricultural.....dis 75&15
Mechanic's.....dis 55&10& 0
Bemis & Call's Combination.....dis 30
Donohue's Engineers.....dis 20&15
Lamson & Sessions Engineers.....dis 65
Billings & Spencer's Drop Forged.....dis 25
William's " " .....dis 25
Alligator " " .....dis 40

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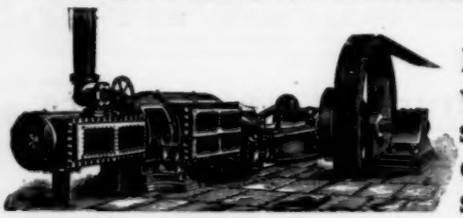

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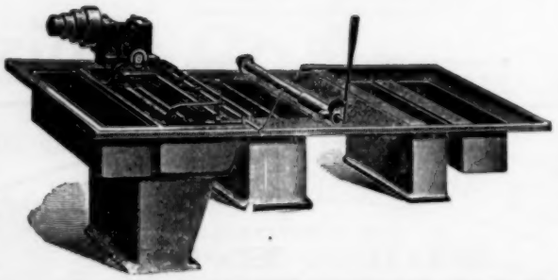

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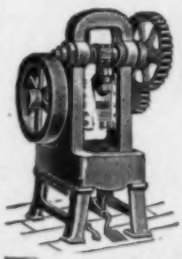

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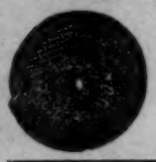

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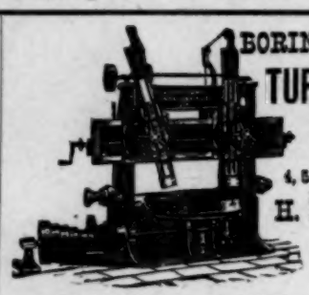

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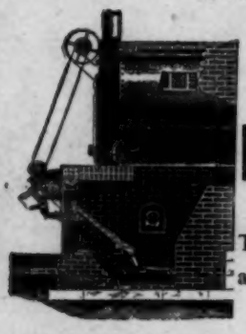

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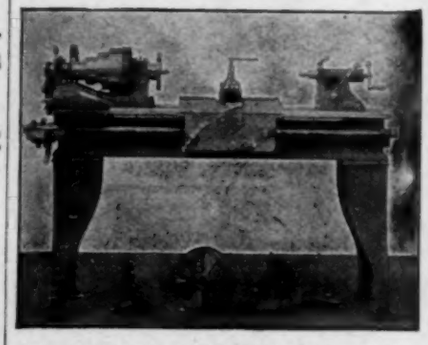

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